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AN
ACCOUNT
OF THE
Bilious remitting and intermitting
YELLOW FEVER,
AS IT APPEARED IN
PHILADELPHIA,
IN THE YEAR 1794.

M E D I C A L
Inquiries and Observations:

CONTAINING
AN ACCOUNT
OF THE

*Bilious remitting and intermitting
YELLOW FEVER,*

AS IT APPEARED IN PHILADELPHIA IN THE YEAR 1794.

TOGETHER WITH
AN INQUIRY

INTO THE
PROXIMATE CAUSE OF FEVER;

AND

A Defence of Blood-letting

AS A
REMEDY

FOR

CERTAIN DISEASES.

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THE PREFACE.

IT is common in the Preface to Medical books to extol facts, at the expence of theory. Were I disposed to consider the comparative merit of each of them, I should derive most of the evils of medicine from supposed facts, and ascribe all the remedies which have been uniformly and extensively useful, to such theories as are true. Facts are combined and rendered useful, only by means of theories ; and the more disposed men are to reason, the more minute and extensive they become in their observations. Under the influence of these opinions, I have ventured to deliver, in the following pages, some new principles in medicine. I wish it had been convenient to have kept them a few years longer from the public eye, in order to have improved them by slow and frequent revisions ; but the importunities of

my pupils, added to a sense of the precarious tenure by which I hold a laborious life, have induced me to publish them in their present concise and immature state. If they lead the reader to exercise his reason in examining them carefully, he will readily supply my deficiency of time and study in preparing them for the press. He will reject what is erroneous in them, and apply what is not so, to all the diseases of the human body.

The Account of the Yellow Fever, as it appeared in Philadelphia in 1794, will, I hope, be useful, by bringing more facts to light upon the subject of its origin, and by exhibiting that variety in the symptoms and method of cure, which is produced by the difference of season in all epidemics.

In stating the conduct, and opposing the opinions of my medical brethren, I have not been actuated by the least unkindness to any one of them. I lament being called to this painful duty, but it must be performed by somebody, and in this way only can we discharge

charge our obligations to those men who, at the expense of character and fortune, have put us in the peaceable possession of all our knowledge in medicine; for, however strange it may appear, I believe we have not admitted a useful medical principle, or remedy of any kind, but what has cost the authors of them ~~more or less~~ conflicts with cotemporary physicians.

If the principles contained in this volume should be received with candour, they shall be followed (life and health permitting) by an application of them to the cure of the gout, and of the diseases of the mind.

BENJAMIN RUSH.

2d July, 1796.

 The reader is desired to correct the following mistakes:—

In page 3, line 14 from the top, for *them*, read *the earth*. In line the last of the same page, for *be*, read *become*.

— p. 71, line 12, insert the word *hot*, before *climates*.

— the last line of p. 96, insert *without malignant symptoms*, after the word *intermittent*, and erase the same in the first line of p. 97.

— p. 103, line the 8th from the bottom, insert *though it was performed sparingly towards its close*, after the word *fever*.

— p. 110, line the 3d from the top, instead of *appear to have thrown*, insert *probably threw*. In line 4th, instead of *and*, read *for*. And in lines 8 and 9, instead of *and I think*, read *or perhaps*.

— p. 232, line 14th from the top, instead of *connected with*, read *confined to*.

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AN
ACCOUNT, &c.

I CONCLUDED the History of the symptoms of the Bilious Remitting Yellow Fever as it appeared in Philadelphia in the year 1793, by taking notice that the diseases which succeeded that fatal epidemic, were all of a highly inflammatory nature.

I have formerly described the weather and diseases of the months of March and April in the spring of 1794.

The weather during the first three weeks of the month of May was dry and temperate, with now and then a cold day and night. The strawberries were ripe on the 15th, and cherries on the 22d day of the month in several of the city gardens.

A shower of hail fell on the afternoon of the 22d, which broke the glass windows of many houses. A single stone of this hail was found to weigh two drachms. Several people collected a quantity of it, and preserved it till the next day in their cellars, when they used it for the purpose of cooling their wine. The weather after this hail storm was rainy during the remaining part of the month. The diseases were still inflammatory. Many persons were afflicted with a sore mouth in this month.

The weather in June was pleasant and temperate. Several intermittents, and two very acute pleurisies occurred in my practice during this month. The intermittents were uncommonly obstinate, and would not yield to the largest doses of the bark.

In a son of Mr. Samuel Coates of seven years old, the bark produced a sudden translation of this state of fever to the head, where it produced all the symptoms of the first stage of internal dropsy of the brain. This once formidable disorder yielded in this case to three bleedings, and other depleting medicines. The blood drawn in every instance was fizzy.

From the inflammatory complexion of the diseases of the spring, and of the beginning of June,
I expected

I expected the fevers of the summer and autumn would be of a violent and malignant nature. I was the more disposed to entertain this opinion from observing the stagnating filth of the gutters of our city ; for the citizens of Philadelphia having an interest in rejecting the proofs of the generation of the epidemic of 1793 in their city, had neglected to introduce the regulations which were necessary to prevent the production of a similar fever from domestic putrefaction. They had, it is true, taken pains to remove the earth and offal matters which accumulated in the streets ; but these, from their being always dry, were inoffensive as remote causes of disease. Perhaps the removal of them did harm, by preventing the absorption of the miasmata which were constantly exhaled from the gutters.

On the 6th of June Dr. Physick called upon me, and informed me that he had a woman in the yellow fever under his care. The information did not surprise me, but it awakened suddenly in my mind the most distressing emotions. I advised him to inform the mayor of the city of the case, but by no means to make it more public, for I hoped that it might be a sporadic instance of the disorder, and that it might not be general in the city.

On the 12th of the month my fears of the return of the yellow fever were revived by visiting Mr. Isaac Morris, whom I found very ill with a violent puking, great pain in his head, a red eye, and a slow tense pulse. I ordered him to be bled, and purged him plentifully with jalap and calomel. His blood had that appearance which has been compared by authors to the washings of raw flesh in water. Upon his recovery he told me that he suspected he had had the yellow fever, for that his feelings were exactly such as they had been in the fall of 1793, at which time he had an attack of that disorder."

On the 14th of June I was sent for in the absence of Dr. Mease, to visit his sister in a fever. Her mother who had become intimately acquainted with the yellow fever by nursing her son and mother in it, the year before, at once decided upon the name of her daughter's disorder. Her symptoms were violent, but they appeared in an intermitting form. Each paroxysm of her fever was like a hurricane to her whole system. It excited apprehensions of immediate dissolution in the minds of all her friends. The loss of sixty ounces of blood by five bleedings, copious doses of calomel and jalap, and a large blister to her neck, soon vanquished this malignant intermittent

termittent, without the aid of a single dose of bark.

During the remaining part of the month, I was called to several cases of fever which had symptoms of malignity of a suspicious nature. The son of Mr. Andrew Brown had an haemorrhage from his nose in a fever, and a case of menorrhagia occurred in a woman who was affected with but a slight degree of fever.

In the course of this month I met with several cases of swelled testicles, which had succeeded fevers so slight as to have required no medical aid. Dr. Desportes records similar instances of a swelling in the testicles which appeared during the prevalence of the yellow fever in St. Domingo in the year 1741. *

In the month of July I visited James Lefferty and William Adams, both of whom had, with the usual symptoms of yellow fever, a yellow colour on their skin. I likewise attended three women, in whom I discovered the disease under forms in which I had often seen it in the year 1793. In two of them it appeared with symptoms of a violent colic, which

* *Histoire des Maladies de Saint Domingue*, p. 112.

yielded only to frequent bleedings. In the third, it appeared with symptoms of pleurisy, which was attended with a constant haemorrhage from the uterus, although blood was drawn almost daily from her arm for six or seven days. About the middle of this month many people complained of a sickness at stomach, which in some cases produced a puking, without any symptoms of fever.

During the month of August, I was called to Peter Denham, Mrs. Bruce, a son of Jacob Gribble's, Mr. Cole, John Madge, Mrs. Gardiner, Miss Purdon, Mrs. Gavin, and Benjamin Cochran, each of whom had all the usual symptoms of the yellow fever. I found Mr. Cochran sitting on the side of his bed, with a pot in his hand, into which he was discharging black bile from his stomach, on the 6th day of the disorder. He died on the next day. Mrs. Gavin died on the 6th day of her disorder, from a want of sufficient bleeding, to which she objected from the influence of her friends. Besides the above persons, I visited Mr. George Eyre at Kensington, Mr. Thomas Fitzsimons, and Thomas M'Kean, jun. son of the chief justice of Pennsylvania, all of whom had the disorder, but in a moderate degree. From none of them had I as yet observed the fever to be propagated by contagion, and therefore I took no steps to alarm my fellow-citizens

citizens with the unwelcome news of its being in town. But my mind was not easy in this situation, for I daily heard of persons who died of the disorder, who might probably have been saved had they applied early for relief, or had a suspicion become general among all our physicians of the existence of the yellow fever in the city. The colera infantum was common during this, and part of the preceding month. It was more obstinate and more fatal than in common years.

On the 12th of this month a letter from Baltimore announced the existence of the yellow fever in that city. One of the patients whom I visited in this month, in the fever, Mr. Cole, brought the contagion of it in his body from that place.

On the 25th of the month two members of a committee lately appointed by the government of the state, for taking care of the health of the city, called upon me to know whether the yellow fever was in town. I told them it was, and mentioned some of the cases that had come under my notice; but informed them at the same time, that I had seen no case in which it had been contagious, and that in every case where I had been called early, and where my prescriptions had been followed, the disease had yielded to medicine.

On the 29th of the month, I received an invitation to attend a meeting of the Committee of Health, at their office in Walnut Street. They interrogated me respecting the intelligence I had given to two of their members on the 25th. I repeated it to them, and mentioned the names of all the persons I had attended in the yellow fever since the 9th of June.

As I considered the filth of the gutters, and the stagnating water in the neighbourhood of the city to be the remote causes of this fever, I advised the Committee to have them both removed, and thereby to prevent the spreading of the disorder.

On the first week in September the disease appeared to be contagious in several families, and the number of my patients was thereby daily multiplied. I now considered it as criminal to conceal any longer the prevalence of the disease in our city, or to elude the inquiries that were directed to me by my fellow-citizens, respecting it. In vain did I wait for the alarm to come from another quarter. I recollect the flanders to which I had exposed myself the year before, by giving the first notice of the prevalence of the fever in our city. But I did not hesitate in this situation, to offer up my reputation a second time as a sacrifice for the lives of my fellow

fellow-citizens. In order to render the information as public as possible, I addressed a letter to the mayor of the city on the 2d of September, in which I stated the existence, and contagious nature of the disease. The contents of this letter, and my information to the Committee of Health respecting the yellow fever, drew upon me the following attack in Mr. Fenno's newspaper.

For the Gazette of the United States.

“ MR. FENNO,

“ I BEG leave, through the channel of your paper, to enquire of the physician who reported to the inspectors of health last Friday, that “ the yellow fever had again made its appearance in this city, but that it was not at present contagious,” what could have induced him to make such a report? No benefit can arise to the public from a knowledge of such a fact, admitting it to be as stated; but a great deal of damage: because such reports cannot fail of alarming and filling with dread, the minds of those who are not possessed of the Doctor's fine discernment and capacity of splitting diseases into grades, sub-grades, and semi-grades; therefore such a report will not only render multitudes uneasy, and interrupt the usual course of

of business, but injure the interest and reputation of the city in several other respects.

“ If the disease really existed, it would be commendable to sound the alarm—it would be criminal to be silent; but if it is not in the city, or if being in the city, it is not contagious, it is the height of cruelty to create useless terror and alarm in the minds of the citizens.

“ But Mr. Fenno, is it not very extraordinary, if the disease is in the city, and the physician alluded to has had twenty-six cases of it since June, that it has appeared to none of the other physicians, not even to those who attend the Dispensary, which I am assured from the best authority is the case?

“ A physician who has great weight with the credulous and ignorant, has already attempted to ruin the reputation of this flourishing and delightful city, by publishing an opinion that the late pestilential fever was generated in it; and that its situation and climate is favourable to the generation of the most malignant maladies. If such an opinion was not believed by every man who knows the character of that physician to be a mere invention to support a mistaken theory, or that it proceeded

from

from a rage for being esteemed the most learned man in the universe; the author would in a few years have the divine satisfaction of seeing this populous and prosperous city deserted by all its opulent inhabitants, and become a solitary waste where he might sit alone, ‘smiling ghastly o’er its ruins, and enjoying the fruits of his singular opinion.’

“ If the opinion of that physician was founded in fact, Mr. Fenno, such would be the blessed consequence; for who that has any regard for health or life would venture to remain in a city notorious for generating plagues which put life in perpetual jeopardy ?

“ This, however, fortunately is not credited, and the city, in spite of the reveries of philosophers, physicians, and conjurers, will flourish for ages yet to come; and when all the sources of stagnant water in its suburbs come to be removed or corrected, it will be one of the most healthy situations in America. Open on every side to the access of the winds—with a dry soil—streets favourably arranged—the inhabitants industrious, cleanly, and well informed—it cannot in the nature of things be unhealthy. Compare its bills of mortality with those of Paris, London, Edinburgh, Vienna, or Stockholm,

holm, and you will at once be convinced how much more healthful it is than either of those.

“ Be under no concern my fellow-citizens, the yellow fever is not in our city, nor is it possible for it to be generated in it, in its present situation.

WALTER QUÆRIST.”

On the 13th of September I wrote a second letter to the Committee of Health, in which I declared the disease to be contagious, and urged them to make the information I gave them public. My reasons for this advice were stated in the following words: “ It will excite the citizens to apply early for medical aid, and it will produce in the minds of such of the physicians as are unprejudiced, an early suspicion of the presence of the disease, in those cases where it comes on with its less obvious symptoms.”

None of these communications produced the effect that was intended by them. Dr. Physick and Dr. Dewees supported me in my declaration, but their testimony did not protect me from the grossest calumnies of my fellow-citizens. One of my friends informed me that he had heard a proposal in a public

public company to "drum me out of the city." A charge of insanity which had been made against me the year before, was now revived, and propagated with so much confidence, that one of my patients who had believed it, expressed her surprise at perceiving no deviation from my ordinary manner, in a sick-room. Several of the physicians of the city united in the flanders which were thrown out against me; and notwithstanding they daily attended, or lost patients in the yellow fever, they denied that any cases of it had occurred in their practice. To these cases they gave other names. I shall briefly enumerate these names, together with the opinions of some of the physicians respecting the fever. This detail will be useful; for by exposing the danger and fatal consequences of error and deception, we shall prevent their being repeated, and thereby prepare the way for the more ready and universal admission of truth, upon the subject of the fever. Thus ignorance and vice will appear, even in the science of medicine, not to have existed in vain.

It was called,

1. A common intermittent.
2. A bilious fever.
3. An inflammatory remitting fever.
4. A putrid fever.
5. A nervous fever.
6. A dropsy of the brain.

brain. 7. A lethargy. 8. Pleurisy. 9. Gout.
10. Rheumatism. 11. Colic. 12. Dysentery.
And 13. Sore throat.*

It was said further, not to be the yellow fever because it was not contagious, and because some who had died of it, had not a sighing in the beginning, and a black vomiting in the close of the disease. Even where the black vomiting and yellow skin occurred, they were said not to constitute a yellow fever, for that those symptoms occurred in other fevers.

A further detail of the names of this fever, and of the opinions of the physicians will appear presently in their report to the Committee of Health on the 30th of September.

Truth, it has often been said, is an unit, but this is not the case with error. While the physicians who asserted that the yellow fever was in town, agreed in fixing the same name to every case of it, the physicians who propagated the contrary opinion, gave different names to the same fever.

* A sore throat sometimes occurs as a symptom of the yellow fever. It is taken notice of by Dr. Blane in his History of the Fever in the West Indies.

In one instance a citizen of Philadelphia was said by one of his physicians to have died of a lethargy, and by another, of a nervous fever. To keep up the latter idea, his death was announced in the public papers, to have occurred after an illness of two weeks.

I hope to shew hereafter, that it is not more improper to say that men are of different species, because they are tall and short, or because some are long, and others short lived, than that fevers are of different species, because they vary in their symptoms and duration.

The conduct of the Committee of Health was not less improper than that of the physicians. They not only refused to make the existence of the fever in the city public, but refused to open Bush-hill hospital for the reception of the poor, although that convenient and spacious building had been hired by the city for that purpose, and sent several poor persons to the hospital at State Island. This situation was preferred to Bush-hill, to prevent the citizens being alarmed, and probably to favour the opinion that the disease was imported. About the same time they sent invitations to all the physicians in the city (Dr. Physick, Dr. Dewees, and one more excepted) to attend a meeting of the Board, at the

the City Hall, in order to ascertain the state of the city. The following publication was the result of that meeting.

HEALTH-OFFICE,

Port of Philadelphia, 1st October, 1794.

“ THE Board of Health, feeling, in common with the rest of their fellow-citizens, a concern for the interest and safety of the city, were induced to make a general invitation to the Faculty, to meet them at the City Hall, on Tuesday the 30th September, in order that from their communications a just state of the health of the city might be obtained. Accordingly, the following physicians were pleased to attend, *viz.*

Dr. Samuel Duffield,	Dr. Kuhn,
Dr. Parke,	Dr. Hodge,
Dr. Dunlap,	Dr. Currie,
Dr. Wistar,	Dr. Benj. Duffield.
Dr. Porter,	and
Dr. Annan,	Dr. Woodhouse.

“ From the whole of these gentlemen, to the question of a contagious disease (that is, a disease which had been communicated from one person to another) existing at this time, there were answers in the negative.

“ It was then proposed that cases of autumnal fevers, which were considered dangerous *to the patients*, should be mentioned. To this

“ Dr. Currie answered, that an aged female in a remittent fever, and a boy in the yellow fever, were the only cases apparently dangerous under his care.

“ Dr. Benjamin Duffield has two cases of autumnal remittent fevers, dangerous, without any contagion annexed to it.

“ Dr. Parke has one case, considered dangerous.

“ Dr. Wistar. One case that may be dangerous.

“ Dr. Hodge. Five cases that probably will become putrid and dangerous.

“ Dr. Barton, though not present, communicated through a member of the Board, that he has no case of a contagious nature.

“ Drs. Rush and Say, not being present, were so obliging as to make their communications in writing, which are hereto subjoined.—From

“Dr. Rush. ‘Out of about thirty patients whom I visit daily, who are confined by bilious remitting and intermitting fevers, twelve of them have fevers of the highest or most inflammatory degree, commonly called yellow fevers. All of them are tending to a favourable issue, and from the mode in which they have been treated, I hope no contagion will be generated by them.’

“From Dr. Say. ‘Within the compass of my practice there are a number of people labouring under remitting and intermitting fevers: I have had, I have no doubt, several cases within the ten days past, of the malignant fever, though at present I do not know that I have a decided case of that kind.’

“The Board of Health, in addition to the foregoing remark, that they are not acquainted with any cases of a dangerous nature, other than has been already stated—and upon the whole, cannot but felicitate their fellow-citizens, at a time when alarms and injurious reports have been industriously circulated to the prejudice of the health of the city, that amongst the practice of such a number of physicians, there is not one case of a contagious nature apparent, and so very few who are dangerously ill.

The

“ The board further have the pleasure to inform the citizens that although the house at Bush-Hill was prepared for the reception of such sick persons as were proper objects for that place on the 26th of last month, there is not now, nor has there been a single patient there.

“ By order, and on behalf of the Board of Health.

JACOB MORGAN, Chairman.”

“ ~~Esq~~ The citizens are requested to meet this evening at 6 o'clock, at the City Hall, to take into consideration the alarming accounts of the progress of a contagious disorder at Baltimore, and to devise proper measures to protect the citizens from the effects thereof.”

The reader will please to take notice, that the question by the Committee, was whether “ *a contagious* disease existed at *this time* in the city.” Why was not an inquiry made whether the *yellow* fever existed at that time in the city? or, Why was that fever designated by its being contagious, a character which by no means belongs to it universally, and that does not constitute its principal danger; for it is well known that in the West Indies, it affects so seldom by contagion, as to furnish a controversy among West Indian physicians, con-

cerning its contagious nature? Even in the city of Philadelphia, it was not uniformly contagious in 1793, many having escaped it who were constantly exposed to its contagion. But further. Why, was there no retrospect in the inquiry into the state of the city, during the weeks or months that had preceded the 30th of September? Two of the physicians who asserted that they *then* had no cases of yellow fever under their care, had acknowledged that they had had several cases of it a few weeks before. It is impossible to review this report, without blushing for the shameful submission made by the science of medicine, to the commercial spirit of the city.

But let not the reader complain of the physicians and citizens of Philadelphia alone. A similar conduct has existed in all cities, upon the appearance of great and mortal epidemics.

It prevailed lately in Algiers, where the Dey refused to let some American prisoners leave a town infected by the plague, denying the existence of the disorder in that place.* Successive attempts by numerous publications, were made to conceal the prevalence of the yellow fever in the cities of New

* See Col. Humphries's letter to the citizens of the United States, dated Lisbon, July 11, 1794.

York,

York, Baltimore and Charleston, for two years past. Such was this selfish disposition in the Committee of Health in New York in the year 1795, that they wrote to the Committee of Health in Philadelphia, to deliver up the names of several persons who had in private letters to their friends, which had been published, asserted that the yellow fever prevailed in that city. But the contracted spirit of this Committee did not end here. After they were compelled to acknowledge the prevalence of the fever among them, they endeavoured to compose the fears of their fellow citizens, by informing them, that a “large proportion of the deaths hitherto reported, had fallen among emigrants lately from Europe, strangers, and other transient persons,”† thereby intimating, that the obligations to sympathy should be confined wholly to permanent and wealthy citizens.

Nor is it any thing new for mortal diseases to receive mild and harmless names from physicians. The plague was called a spotted fever for several months, by some of the physicians of London in the year 1665.

† Report of the Committee of Health of New York, dated Friday evening, September 18, 1795.

Added to that servility to wealth, which disposes physicians to deny the existence of pestilential fevers in cities, there were two other reasons which led some of the physicians of Philadelphia, to deny the prevalence of the yellow fever in our city ; these reasons were ; first, The change which they had made in their practice, for they had adopted the depleting system in a certain degree ; but they declared that they used it not in the yellow fever, but in an inflammatory bilious remittent ; and secondly, Their inability to derive the disease from importation. To have acknowledged the existence of the disease in our city, therefore, would have been a dereliction of two of the principal errors held by them in the year 1793.

Thus while nurses, bleeders, clergymen and occasional visitors of the sick, and in some instances, the sick themselves, united in deciding upon the character and name of our fever, a majority of the physicians united in persuading the citizens that it existed only in the imaginations of two or three men.

From a review of the conduct of cities upon the subject of diseases, an important inference may be made ; and that is, to consider their public reports in favour

favour of the health of their inhabitants, as the precursors of great and mortal epidemics.

It has been asked, why I am more anxious to have the existence of the yellow fever believed, than any of the other physicians of the city ; and why I did not cure it, without calling it by its unpopular name ? To this I answer, that I consider the making the disease public, as soon as it appears in a city, and the calling it by its common and vulgar name, to be a duty, indirectly included in that divine precept which forbids the taking away a human life. Dr. Sydenham acknowledges that he generally lost the first four or five patients he met with in a new disease, and all candid physicians must confess the want of the same success in the beginning, that they have in the close of a new epidemic. Now this want of success may at all times be prevented from becoming general, by notice being given of the existence of a new disease as soon as it makes its appearance. The propagation of the disease when contagious, may moreover be checked, or its malignity mitigated, by means of diet, or medicine, when its prevalence is generally known, and thereby many thousand lives may be saved. There was once a law in Pennsylvania, which punished the concealment of a malignant and contagious disease in the city of Philadelphia. Such a law would be a

blessing in every country. Whole communities might be saved by it.

Notwithstanding the pains which were taken to discredit the report of the existence of the yellow fever in the city, it was finally believed by many citizens, and a number of families in consequence of it, left the city. And in spite of the harmless names of intermitting and remitting fever, and the like, which were given to the disorder, the bodies of persons who had died with it, were conveyed to the grave in several instances upon a hearse, the way in which those who died of the yellow fever were buried the year before.

From the influence of occasional showers of rain, in the months of September and October, the disease was frequently checked, so as to disappear altogether for two or three days in my circle of practice. It was observed that while showers of rain checked it, moist or damp weather without rain, favoured its propagation. It was further kept from becoming general by the mode of treating it; for nearly all the physicians purged, and bled more or less, in every case of fever they were called to, by which means the production of a large mass of contagion, was prevented. This peculiarity in the practice of the opposing physicians, did not escape the notice

of

of several of the reflecting citizens of Philadelphia, who remarked very properly, that two or three bleedings, and purges of calomel and jalap were not the usual remedies for intermitting and remitting fevers of common years.

The cold weather in October checked the fever, but it did not banish it from the city. It appeared in November, and in all the succeeding winter and spring months. The weather during these months being uncommonly moderate, will account for its not being destroyed at the time in which the disease usually disappeared in former years.

The causes which predisposed to this fever were the same as in the year 1793. Persons of full habits, strangers, and negroes were most subject to it. It may seem strange to those persons who have read that the negroes are seldom affected with this fever in the West Indies, that they were so much affected by it in Philadelphia. There were two reasons for it. Their manner of living was as plentiful as that of white people in the West Indies, and they generally resided in alleys and on the skirts of the city, where they were more exposed to noxious exhalation, than in its more open and central parts.

The summer fruits, from being eaten before they were ripe, or in too large a quantity, became frequently

quently exciting causes of this fever. It was awakened in one of my patients by a supper of peaches and milk. Cucumbers in several instances gave vigor to the miasmata which had been previously received into the system. Terror excited it in two of my patients. In one of them, a young woman, this terror was produced by hearing, while she sat at dinner, that a hearse had passed by her door with a person on it who had died of the yellow fever. Vexation excited it in a foreign master of a vessel in consequence of a young woman suddenly breaking an engagement to marry him. The disease terminated fatally in this instance.

It was sometimes unfortunate for patients when the disease was excited by an article of diet, or by any other cause which acted suddenly upon the system; for it led both them, and in some instances their physicians, to confound those exciting causes with its remote cause, and to view the disease without the least relation to the prevailing epidemic. It was from this mistake that many persons were said to die of intemperance, of eating ice creams, and of trifling colds, who certainly died of the yellow fever. The rum, the ice creams, and the changes in the air, in all these cases acted like sparks of fire which set in motion the quiescent particles of tinder or gunpowder.

I shall

I shall now proceed to describe the symptoms which this fever assumed during the periods which have been mentioned. This detail will be interesting to physicians who wish to see how little nature regards the nosological arrangement of authors in the formation of the symptoms of diseases, and how much the seasons influence epidemics. A physician who had practiced medicine near sixty years in the city of Philadelphia, declared that he had never seen the dysentery assume the same symptoms in any two *successive* years. The same may be said probably of nearly all epidemic diseases.

In the arrangement of the symptoms of this fever, I shall follow the order I adopted in my Account of the Yellow Fever of 1793, and describe them as they appeared in the sanguiferous system—the liver, lungs, and brain—the alimentary canal—the secretions and excretions—the nervous system—the senses and appetites—upon the skin, and in the blood.

Two premonitory symptoms struck me this year which I did not observe in 1793. One of them was a frequent discharge of pale urine for a day or two before the commencement of the fever; the other was sleep unusually sound, the night before the attack of the fever. The former symptom was a precursor of the plague of Bassora in the year 1773.

I. I observed but few symptoms in the sanguiferous system different from what I have mentioned in the fever of the preceding year. The slow and intermitting pulse occurred in many, and a pulse nearly imperceptible, in three instances. It was seldom very frequent. In John Madge, an English farmer who had just arrived in our city, it beat only 64 strokes in a minute for several days, while he was so ill as to require three bleedings a-day, and at no time of his fever did his pulse exceed 96 strokes in a minute. In Miss Sally Eyre the pulse at one time was at 176, and at another time it was at 140; but this frequency of pulse was very rare. In a majority of the cases which came under my notice, where the danger was great, it seldom exceeded 80 strokes in a minute. I have been thus particular in describing the frequency of the pulse, because custom has created an expectation of that part of the history of fevers; but my attention was directed chiefly to the different degrees of force in the pulse as manifested by its tension, fulness, intermissions, and inequality of action. The *bobbling* pulse was common. In John Geraud, I perceived a quick stroke to succeed every two strokes of an ordinary healthy pulse. The intermitting and depressed pulse occurred in many cases. I called it the year before a *sulky* pulse. One of my pupils, Mr. Alexander, called it more properly a .

locked

locked pulse. I think I observed this state of the pulse to occur chiefly in persons in whom the fever came on without a chilly fit.

Hæmorrhages occurred in all the grades of this fever, but less frequently in my practice this year than in the year before. It occurred after a ninth bleeding in Miss Sally Eyre from the nose and bowels. It occurred from the nose after a sixth bleeding in Mrs. Gardiner, who was at that time in the sixth month of her pregnancy. This symptom, which was accompanied by a tense and quick pulse, induced me to repeat the bleeding a seventh time. The blood was very sify. I mention this fact to establish the opinion that hæmorrhages depend upon too much action in the blood-vessels, and that they are not occasioned by a dissolved state of the blood.

There was a disposition at this time to hæmorrhage in persons who were in apparent good health. A private in a company of volunteers commanded by Major M'Pherson, informed me that three of his messmates were affected by a bleeding at the nose for several days after they left the city on their way to quell the insurrection in the western counties of Pennsylvania.

II. The liver did not exhibit the usual marks of inflammation. Perhaps my mode of treating the fever

fever prevented those symptoms of hepatic affection which belong to the yellow fever in tropical climates. The lungs were frequently affected; and hence the disease was in many instances called a pleurisy or a catarrh. This inflammation of the lungs occurred in a more especial manner in the winter season. It was distinguished from the pleurisies of common years by a red eye; by a vomiting of green or yellow bile; by black stools; and by requiring very copious blood-letting to cure it.

The head was affected in this fever, not only with coma and delirium, but with mania. This symptom was so common as to give rise to an opinion that madness was epidemic in our city. I saw no case of it which was not connected with other symptoms of the bilious remitting fever. The Rev. Mr. Keating, one of the ministers of the Roman church, informed me that he had been called to visit seven deranged persons in his congregation in the course of one week, in the month of March. Two of them had made attempts upon their lives. This mania was probably, in each of the above cases, a symptom only of general fever. The dilatation of the pupil was universal in this fever.

Sore eyes were common during the prevalence of this fever. In Mrs. Leaming this affection of the eyes was attended with a fever of a tertian type.

III. The

III. The alimentary canal suffered as usual in this fever. A vomiting was common upon the first attack of the disorder. I observed this symptom to be less common after the cold and rainy weather which took place about the first of October.

I have in another place mentioned the influence of the weather upon the symptoms of this disease. In addition to the facts which have been formerly recorded, I shall add one more from Dr. Desportes. He tells us, that in dry weather the disease affects the head, and that the bowels in this case are more obstinately costive than in moist weather. This influence of the atmosphere on the yellow fever will not surprise those physicians who recollect the remarkable passage in Hippocrates in which he says, that in the violent heats of summer, fevers appeared, but without any sweat; but if a shower, though ever so slight, appeared, a sweat broke out in the beginning.* I observed further, that a vomiting rarely attended those cases in which there was an absence of a chilly fit in the beginning of the fever. The same observation is made by Dr. Desportes.†

* Epidemics, Book XI. Sect. 1.

† Les Maladies de St. Domingue, Vol. I. p. 193.

The matter discharged by vomiting was green or yellow bile in most cases. Mrs. Jones, the wife of Captain Lloyd Jones, and one other person, discharged black bile within one hour after they were attacked by the fever. I have taken notice in the second edition of my Account of the Yellow Fever, that a discharge of bile in the beginning of this fever was always a favourable symptom. Dr. Davidson of St. Vincents, in a letter to me, dated the 22d July 1794, makes the same remark. It shews that the biliary ducts are open, and that the bile is not in that viscid and impacted state which is described in the dissections of Dr. Mitchel. A distressing pain in the stomach, called by Dr. Cullen gastrodynna, attended in two instances. A burning pain in the stomach, and a foreness to the touch of its whole external region, occurred in three or four cases. Two of them were in March 1795. In Mrs. Vogles, who had the fever in September 1794, the sensibility of the pit of the stomach was so exquisite, that she could not bear the weight of a sheet upon it.

Pains in the bowels were very common. They formed the true bilious colic, so often mentioned by West India writers. In John Madge these pains produced a hardness and contraction of the whole external region of the bowels. They were periodical

dical in Miss Nancy Eyre, and in Mrs Gardiner, and in both cases were attended with diarrhœa.

COSTIVENESS without pain was common, and in some cases so extremely obstinate as to resist for several days the successive and alternated use of all the usual purges of the shops.

Flatulency was less common in this fever than in the year 1793.

The disease appeared with symptoms of dysentery in several cases.

IV. The following is an account of the state of the SECRETIONS and EXCRETIONS in this fever.

A puking of bile was more common this year, than in year 1793. It was generally, of a green or yellow colour. I have remarked before, that two of my patients discharged black bile within an hour after they were affected by the fever, and many discharged that kind of matter which has been compared to coffee grounds, towards the close of the disease.

The fæces were black, in most cases where the symptoms of the highest grade of the fever attend-

ed. In one very malignant case, the most drastic purges brought away by fifty evacuations, nothing but natural stools. The purges were continued, and finally black fæces were discharged which produced immediate relief. In one person, the fæces were of a light colour. In this patient the yellowness in the face was of an orange colour, and continued so for several weeks after his recovery.

The urine was in most cases high coloured. It was scanty in quantity in Peter Brown, and totally suppressed in John Madge for two days. I ascribed this defect of natural action in the kidneys, to an *engorgement* in their blood vessels, similar to that which takes place in the lungs and brain in this fever. I had for some time entertained this idea of a morbid affection of the kidneys, but I have lately been confirmed in it by the account which Dr. Chisholm gives of the state of one of the kidneys in a man whom he lost with the Beullam fever at Grenada. “The right kidney (says the Doctor) was mortified, although during his illness no symptom of inflammation of that organ was perceived.”* It would seem as if the want of action in the kidneys, and a defect in their functions

* *Essay on the Malignant Pestilential Fever introduced into the West Indies from Beullam*, p. 137.

were not necessarily attended with pain. I recollect to have met with several cases in 1793, in which there was a total absence of pain in a suppression of urine, of several days' continuance. The same observation is made by Dr. Chisholm, in his account of the Beullam fever of Grenada.* From this fact it seems probable, that pain is not the effect of any determinate state of animal fibres, but requires the concurrence of morbid, or preternatural excitement to produce it. I met with but one case of strangury in this fever. It terminated favourably in a few days. I have never seen death in a single instance in a fever from any cause, where a strangury attended, and I do not recollect ever to have seen a fatal issue to a fever where this symptom was accidentally produced by a blister. From this fact there would seem to be a connection between a morbid excitement in the neck of the bladder, and the safety of more vital parts of the body. The idea of this connection was first suggested to me thirty-and-twenty years ago, by the late Dr. James Leiper of Maryland, who informed me that he had sometimes cured the most dangerous cases of pleurisy after the usual remedies had failed, by exciting a strangury by means of the tincture of Spanish flies, mixed with camphorated spirit of wine.

* P. 224.

The tongue was always moist in the beginning of the fever, but it was generally of a darker colour than last year. When the disease was left to itself, or treated with bark and wine, the tongue became of a fiery red colour or dry and furrowed, as in the typhus fever.

SWEATS were more common in the remissions of this fever, than they were in the year 1793, but they seldom terminated the disease. During the course of the sweats, I observed a deadly coldness over the whole body to continue in several instances, but without any danger or inconvenience to the patient. In two of the worst cases I attended, there were remissions, but no sweats until the day on which the fever terminated. In several of my patients the fever wore away without the least moisture on the skin. The *milk* in one case was of a greenish colour, such as sometimes appears in the serum of the blood. In another female patient who gave suck, there was no diminution in the quantity of her milk during the whole time of her fever, nor did her infant suffer the least injury from sucking her breasts.

I observed tears to flow from the eye of a young woman in this fever, at a time when her mind seemed free from distress of every kind.

V. I pro-

V. I proceed next to mention the symptoms of this fever in the nervous system.

Delirium was less common than last year. I was much struck in observing John Madge, who had retained his reason while he was so ill as to require three bleedings a day, to become delirious as soon as he began to recover, at which time his pulse rose from between 60, and 70 to 96 strokes in a minute. I saw one case of extreme danger in which an hysterical laughing and weeping alternately attended.

I have before mentioned the frequency of mania as a symptom of this disease. An obstinate wakefulness attended the convalescence from this fever in Peter Brown, John Madge, and Mr. Cole.

Fainting was more common in this fever than in the fever of 1793. It ushered in the disease in one of my patients, and it occurred in several instances after bleeding, where the quantity of blood drawn was very moderate.

Several people complained of giddiness in the first attack of the fever, before they were confined to their beds. Sighing was less common, but a hiccup was more so, than in the year before.

John Madge had an immobility in his limbs bordering upon palsy. A weakness in the wrists in one case succeeded a violent attack of the fever.

Peter Brown complained of a most acute pain in the muscles of one of his legs. It afterwards became so much inflamed as to require external applications to prevent the inflammation terminating in an abscess. Mrs. Mitchell complained of severe cramps in her legs.

The sensations of pain in this fever were often expressed in extravagant language. The pain in the head in a particular manner was compared to repeated strokes of a hammer upon the brain, and in two cases in which this pain was accompanied by great heat, it was compared to the boiling of a pot.

The more the pains were confined to the bones and back, the less danger was to be apprehended from the disease. I saw no case of death from the yellow fever in 1793, where the patient complained much of pain in the back. It is easy to conceive how this external determination of morbid action, should preserve more vital parts. The bilious fever of 1780 was a harmless disease, only because it spent its whole force chiefly upon the limbs. This

was

was so generally the case, that it acquired from the pains in the bones which accompanied it, the name of the “break bone fever.” Hippocrates has remarked that pains which descend, in a fever, are more favourable than those which ascend.* This is probably true, but, I did not observe any such peculiarity in the translation of pain in this fever. The following fact from Dr. Grainger will add weight to the above observations. He observed the pains in a malignant fever which were diffused through the whole head, though excruciating, were much less dangerous, than when they were confined to the temples, or forehead.†

I saw two cases in which a locked jaw attended. In one of them it occurred only during one paroxysm of the fever. In both it yielded in half an hour to blood-letting. I met with one case in which there was universal tetanus. I should have suspected this to have been the primary disease, had not two persons been infected by the patient thus disordered, with the yellow fever.

The countenance sometimes put on a ghastly appearance in the height of a paroxysm of the fever.

* Epidemics, book II. section 2.

† Historia febris anomala Batavæ Annorum 1746, 1747, 1748, cap. I.

The face of a lady admired when in health for uncommon beauty, was so much distorted by the commotions of her whole system in a fit of the fever, as to be viewed with horror by all her friends.

VI. The senses and appetites were affected in this fever in the following manner.

A total blindness occurred in two persons during the exacerbation of the fever, and ceased during its remissions.—A great intolerance of light occurred in several cases. It was most observable in John Madge during his convalescence.

A soreness in the sense of touch, was so exquisite in Mrs Kapper about the crisis of her fever, that the pressure of a piece of fine muslin upon her skin gave her pain.

Peter Brown with great heat in his skin, and a quick pulse, had no thirst, but a most intense degree of thirst was very common in this fever. It produced the same extravagance of expression that I formerly said was produced by pain. One of my patients Mr. Cole said he “ could drink up the ocean.” I did not observe thirst to be connected with any peculiar state of the pulse.

George Eyre and Henry Clymer, had an unusual degree of appetite just before the usual time of the return of a paroxysm of fever.

A young man complained to me of being afflicted with nocturnal emissions of seed during his convalescence. This symptom is not a new one in malignant fevers. Hippocrates takes notice of it.* I met with one instance of it among the sporadic cases of yellow fever which occurred in 1793. It sometimes occurs according to Lomius in the commotions of the whole system which take place in epilepsy.

VII. The disease made an impression upon the lymphatic system. Four of my patients had glandular swellings: two of them were in the groin; a third was in the parotid; and the fourth was in the maxillary glands. Two of these swellings suppurated.

VIII. The yellowness of the skin which sometimes attends this fever, was more universal, but more faint than in the year 1793. It was in many cases composed of such a mixture of colours as to resemble polished mahogany. But in a few cases, the yellowness was of a deep orange colour. The former went off with the fever, but the latter often continued for several weeks after the patients recovered. In some

* Epidemics, book IV.

instances

instances a red colour predominated to such a degree in the face as to produce an appearance of inflammation.

In Mrs. Vogles a yellowness appeared in her eyes during the paroxysm of her fever, and went off in its remissions.

In James Lefferty the yellowness affected every part of his body, except his hands, which were as pale as in a common fever.

Peter Brown tinged his sheets of a yellow colour by night sweats, many weeks after his recovery.

There was an exudation from the soles of the feet of Richard Wells's maid, which tinged a towel of a yellow colour.

In my Account of the Yellow Fever of 1793, I ascribed the yellow colour of the skin wholly to a mixture of bile with the blood. I am satisfied that this is the cause of it in those cases where the colour is deep, and endures for several weeks beyond the crisis of the fever; but where it is transitory, and above all, where it is local, or appears only for a few hours during the paroxysm of the fever, it appears probable that it is connected with the mode of

of aggregation of the blood, and that it is produced wholly by some peculiar action in the blood-vessels. A similar colour takes place from the bite of certain animals, and from contusions of the skin; in neither of which cases has a suspicion been entertained of an absorption or mixture of bile with the blood.

A troublesome itching, with an eruption of red blotches on the skin, attended on the first day of the attack of the fever in Mrs. Gardiner.

A roughness of the skin, and a disposition in it to peel off, appeared about the crisis of the fever in Miss Sally Eyre.

That species of eruption which I have elsewhere compared to moscheto bites, appeared in Mrs. Sellers.

John Ray, a day labourer to whom I was called in the last stage of the fever, had petechiæ on his breast the day before he died.

That burning heat on the skin, from which this fever in some countries has derived the name of *Causus*, was more common this year than last. It was sometimes local, and sometimes general. I perceived it in an exquisite degree in the cheeks only of Miss Sally Eyre, and over the whole body of

of John Ray. It had no connection with the rapidity, or force of the circulation of the blood in the latter instance, for it was most intense at a time when he had no pulse.

It is remarkable that the heat of the skin has no connection with the state of the pulse. This fact did not escape Dr. Chisholm. He says he found the skin to be warm while the pulse was at 52, and that it was sometimes disagreeably cold when the pulse was as quick as in ordinary fever.*

IX. I have in another place rejected putrefaction from the blood as the cause or effect of this fever. I shall mention the changes which were induced in its appearances when I come to treat of the method of cure.

Having described the symptoms of this fever as they appeared in different parts of the body, I shall now add a few observations upon its type, or general character.

I shall begin this part of the history of the fever by remarking, that we had but one reigning disease in town during the autumn and winter; that this was a bilious remitting, or intermitting, and

* P. 117.

sometimes

sometimes a yellow fever; and that all the fevers from other remote causes than exhalation or contagion, partook more or less of the symptoms of the prevailing epidemic. As well might we distinguish the rain which falls in gentle showers in Great Britain, from that which is poured in torrents from the clouds in the West Indies, by different names and qualities, as impose specific names and characters upon the different states of bilious fever.

The forms in which this fever appeared were as follow.

1. A tertian fever. Several persons died of the third fit of tertians who were so well as to go abroad on the intermediate day of the fever. It is no new thing for malignant fevers to put on the form of a tertian. Hippocrates long ago remarked, that intermittents sometimes degenerate into malignant acute diseases; and hence he advises physicians to be upon their guard on the 5th, 7th, 9th, and even on the 14th day of such fevers. *

2. It appeared most frequently in the form of a remittent. The exacerbations occurred most commonly in the evening. In some there were exacerbations

* *De Morb. Popular.* L. VII.

in the morning as well as in the evening. But I met with several patients who appeared to be better and worse half a dozen times in a day. In each of these cases, there were evident remissions and exacerbations of the fever.

It assumed in several instances the symptoms of a colic, and *colera morbus*. In one case the fever, after the colic was cured, ended in a regular intermittent. In another, the colic was accompanied by a haemorrhage from the nose. I distinguished this bilious colic from that which is excited by lighter causes, by its always coming on with more or less of a chilliness.* The symptoms of colic and *colera morbus* occurred most frequently in June and July.

4. It appeared in the form of a dysentery in a boy of William Corfield, and in a man whom my pupil Mr. Alexander visited in the neighbourhood of Harrowgate.

5. It appeared in one case in the form of an apoplexy.

6. It disguised itself in the form of madness.

* See Sydenham, Vol. I. p. 212.

7. During the month of November, and in all the winter months, it was accompanied with pains in the sides and breast, constituting what nosologists call the “*pleuritis biliosa*.”

8. The puerperile fever was accompanied during the summer and autumn, with more violent symptoms than usual. Dr. Physick informed me, that two women to whom he was called soon after their delivery, died of uterine hæmorrhages ; and that he had with difficulty recovered two other lying-in women, who were afflicted with that symptom of a malignant diathesis in the blood-vessels.

9. Even dropfies partook more or less of the inflammatory and bilious character of this fever.

10. It blended itself with the scarlatina. The blood in this disorder, and in the puerperile fever, had exactly the same appearance that it had in the yellow fever. A yellowness in the eyes accompanied the latter disease in one case that came under my notice.

A slight shivering ushered in the fever in several instances. But the worst cases I saw, came on without a chilly fit, or the least sense of coldness in any part of the body.

Such

Such was the predominance of the intermitting, remitting, and biliary fever, that the measles, the small-pox, and even the gout itself, partook more or less of its character. There were several instances in which the measles, and one, in which the gout appeared with quotidian exacerbations ; and two in which madness appeared regularly in the form of a tertian.

I mentioned formerly that this fever sometimes went off with a sweat, when it appeared in a tertian form. This was always the case with the second grade of the fever, but never with the first degree of it before the 3d or 4th paroxysm of the fever ; nor did a sweat occur on the 5th or 7th day, except after the use of depleting remedies. This peculiarity in the fever of this year was so fixed, that it gave occasion for my comparing it in my intercourse with my patients, to a lion on the first seven days, and to a lamb during the remaining part of its duration.

The fever differed from the fever of the preceding year in an important particular. I saw or heard of no case which terminated in death on the first or third day. In every case, the fever came on fraught with paroxysms. The moderate degrees of it were of so chronic a nature as to continue for

several weeks when left to themselves. I wish this peculiarity in the epidemic which I am now describing, to be remembered; for it will serve hereafter to explain the reason why a treatment apparently different, should be alike successful in different seasons and in different countries.

The crisis of the fever occurred on uneven days more frequently than in the fever of the year 1793.

I remarked formerly * that remissions were more common in the yellow fever than in the common bilious fever. The same observation applies to critical days. They were observable in almost every case in which the disease was not strangled in its birth. Dr. Chisholm describes the same peculiarity in the Boullam fever. “ I have not met with any disease (says the Doctor) in which the periods were more accurately ascertained.” †

The unity of the states of fever of the autumn appeared, not only in the sameness of some of their most characteristic symptoms, but in their mutually propagating each other. The most malignant states of yellow fever were propagated from a moderate remittent, in a servant girl in Mr. Mitchell’s family,

* Account of the Yellow Fever of 1793. † P. 141.

and a moderate remittent was created in two persons by a man who died of the yellow fever.

In addition to the instances formerly enumerated *, of the predominance of powerful epidemics over other diseases, I shall add two more, which I have lately met with in the course of my reading.

Dr. Chisholm, in describing the pestilential fever introduced into the West Indies from Boullam, has the following remarks. “ Most other diseases degenerated into, or partook very much of this. Dysenteries suddenly stopped, and were immediately succeeded by the symptoms of the pestilential fever. Catarrhal complaints, simple at first, soon changed their nature: convalescents from other diseases were very subject to this, but it generally proved mild. Those labouring at the same time under chronic complaints, particularly rheumatism and hepatitis, were very subject to it. The puerperile fever became malignant, and of course fatal; and even pregnant negro women, who otherwise might have had it in the usual mild degree peculiar to that description of people, were reduced to a very dangerous situation by it. In short, every disease in which the patient was liable to infection, sooner or later af-

* Account of the Yellow Fever, in 1793.

sumed the appearance, and acquired the danger of the pestilential fever.” *

It is worthy of notice, that the fever described by Dr. Chisholm did not infect beyond the distance of *ten* feet. Let us not be surprised therefore, that the yellow fever which infects across streets, should impart its symptoms to all other diseases.

Dr. Desportes ascribes the same universal empire to the yellow fever which prevailed in St. Domingo in the summer of 1733. “ The fever of Siam (says the Doctor) conveyed an infinite number of men to the grave in a short time ; but I saw but one woman who was attacked by it.”

“ The violence of this disease was such, that it subjected all other diseases, and reigned alone. This is the character of all contagious and pestilential diseases. Sydenham, and before him Diemerbroek, have remarked this of the plague.” †

In Baltimore the small-pox in the natural way was attended with unusual malignity and morta-

* P. 129, 130.

† P. 40, 41. See also p. 111—230, 231. Vol. I.

lity, occasioned by its being combined with the reigning yellow fever.

It has been urged as an objection to the influence of powerful epidemics chasing away, or blending with fevers of inferior force, that the measles sometimes supplant the small-pox, and mild intermittents take the place of fevers of great malignity. This fact did not escape the microscopic eye of Dr. Sydenham, nor is it difficult to explain the cause of it. It is well known that epidemics, like simple fevers, are most violent at their first appearance, and that they gradually lose their force as they disappear; now it is in their evanescent and feeble state, that they are jostled out of their order of danger or force, and yield to the youthful strength of epidemics, more feeble under equal circumstances of age than themselves. It would seem from this fact, that an inflammatory constitution of the air, and powerful epidemics both in their aggregate and individual forms, possessed a common character. They all invade with the fury of a savage, and retire with the gentleness of a civilized foe.

It is agreeable to discover from these facts and observations, that epidemic diseases, however irregular they appear at first sight, are all subject to certain laws, and partake of the order and harmony of the universe.

I have

I have remarked that this fever was contagious in a very few instances compared with the preceding year, but its operation upon the body, where, from the absence of an exciting cause, it did not produce fever, was the same as I have elsewhere described. The sensations which I experienced in entering a room where a person was confined with this fever, were so exactly the same with those I felt the year before, that I think I could have distinguished the presence of the disease without the assistance of my eyes, or without asking a single question. After sitting a few minutes near a person ill with this fever I became languid, and faint. Weakness and chilliness, followed every visit I paid to a gentleman at Mr. Oellers's hotel, which continued for half an hour. A burning in my stomach, great heaviness, and a slight inflammation in my eyes with a constant discharge of a watery humour from them for two days, succeeded the first visit I paid to Mrs. Sellers. These symptoms came on in less than ten minutes after I left her room. They were probably excited thus early, and in the degree which I have mentioned, by my having received her breath in my face by inspecting her tonsils, which were ulcerated on the first attack of the fever. Three days after my eyes recovered from their watery and inflamed state, I was exposed to the action of the contagion in a concentrated state by bleeding Mrs. Lloyd Jones.

One of my eyes again became sore, and discharged water for two or three days afterwards. I have related these facts chiefly with a view of offering a conjecture as to the cause of the universal prevalence of ophthalmias, or what are called sore eyes, during the prevalence of great and powerful epidemics.* They were common in all the sickly parts of the United States, in the year 1793, and appeared in many places, as well as in Philadelphia in the Autumn of 1794. They are probably occasioned by a feeble and partial action of exhalation or contagion upon the system.

I recollect having more than once perceived a smell which had been familiar to me during the time I was exposed to the contagion of the yellow fever in 1793. It resembled the smell of the liver of sulphur. I suspected for a while that it arose from the exhalations of the gutters of the city. But an accident taught me that it was produced by the perspiration of my body. Upon rubbing my hands, this odor was increased so as to become not only more perceptible to myself, but in the most sensible degree to my pupil Mr. Otto. From this fact I was satisfied that I was strongly impregnated with the contagion, and I was led by it to live chiefly

* Hippocrates's Epidemics.

upon vegetables, to drink no wine, and to avoid with double care, all the usual exciting causes of fever.

There was another mark by which I distinguished the presence of the contagion of this fever in my system, and that was, wine imparted a burning sensation to my tongue and throat, such as is felt after it has been taken in excess, or in the beginning of a fever. Several persons who were exposed to the contagion of this fever informed me that wine even in the smallest quantity, affected them exactly in the same manner.

I saw one instance in which the disease was excited in twelve hours after the contagion was taken into the body. A lady lately from Rhode Island who laid so near a sick gentleman in a public house as to be disturbed by his groans, humanely went into his room in the morning to offer him all the relief that lay in her power. She found him in the act of puking black matter, and was much shocked at the yellow colour of his face. She did not suspect his disorder to be the yellow fever, for his physicians had denied or concealed it in the family. The speedy death of this gentleman induced her to change her lodgings. In the evening of the same day she went to the theatre, where she was seized with a

chilly fit. The next day I was sent for to visit her. I found her ill with all the symptoms of the yellow fever. She was cured, but the danger and distress from which she escaped, furnished an affecting instance of the cruelty of concealing or denying the existence of contagious and malignant diseases.

The contagious quality of this fever I have remarked, was not confined to its most malignant degrees. Malignity in a fever is not essential to the generation of contagion. Under certain circumstances of the atmosphere, the mildest intermittents are sometimes propagated by contagion.

I attended four persons in this fever who had had it, the year before,

I have mentioned elsewhere that the common modes of preventing the action of contagion on the system had not only failed, but had probably favoured the spreading of the fever in 1793. I was made happy by observing that Dr. Chisholm had borne a testimony against them, in his account of the jail fever of Grenada. It is by destroying a confidence in supposed preventives of the disease, that we shall lead people to the more rational ones of temperance and gentle doses of physic. To a vegetable diet may be added such a mixture of pepper as shall
keep

keep up a constant and vigorous tone in the stomach and bowels, without imparting the least new action to the blood vessels. Mr. Bruce says in his travels, that in one of the sickly countries which he visited, the inhabitants obviated malignant fevers, by this practice. The quantity of pepper mixed with their rice was so great (he says), as to inflame the throats of persons who were not accustomed to it. To this preventive, they add, abstinence from ardent spirits, from weak broths, and decayed fruit. They moreover eat their principal meat after sun-set, when the coolness of the night air imparts a tone to the stomach and thereby facilitates digestion.

It may appear paradoxical at first sight, how generous living should protect from common bilious, and low jail fevers, while it encreases the predisposition to the yellow, and other pestilential fevers. The reason is plain. The action in the blood vessels in the common bilious and jail fevers is so feeble, that a full diet creates an action in the vessels superior to it, while the action excited by the contagion of pestilential fevers is so violent, as not only to refuse to yield to the stimulus of diet, but to be greatly increased by it.

Mr. Bruce relates further that those persons, who lived in smoky houses, escaped bilious fevers. The effect

effect of smoke in checking contagion was evident, in the hospitals constructed without chimneys by Dr. Tilton, during the late war. The fire was kindled in the middle of the earthen floor of the hospital in a hole made in the earth, and the smoke after pervading the room, escaped through a hole in the roof of the building in a perpendicular direction to the fire place. Dr. Clark has added another fact in favor of the prophylactic virtues of smoke. In one instance which came under his notice, it preserved the cooks who worked in a galley from being affected by a contagious fever.*

I have hitherto mentioned the means of preventing the attack of this fever upon individuals. I shall now add a few directions for preventing its admission and propagation in cities.

1st. Let a law be passed to compel physicians, under a severe penalty, to report to a Committee appointed for that purpose, the existence of a malignant contagious fever, as soon as they discover it in any part of the city. Let this Committee call a council of physicians to examine the case so reported; and if a majority of them concur in opinion of its contagious and dangerous nature, let the following steps be taken.

* Vol. I. p. 166.

2dly.

2dly, If the fever appear to have been imported from a foreign country, let the infected vessel be removed from the wharf, and carefully washed and fumigated in the channel of the river, and let her cargo, if any part of it has been landed, be conveyed from the city.

3dly. If the fever appear to be of domestic origin, let the putrid matter which produced it be removed, or covered, so as effectually to destroy all possibility of future exhalation from it. While these precautions are going forward,

4thly. Let all the families which are within fifty yards of the infected person or persons be ordered instantly to remove into houses or tents, to be provided for them at the public expense. Let chains then be placed across the streets which lead to the sick, and let guards be appointed to prevent all access to the infected parts of the city, except by physicians, and nurses, and such other persons as are necessary to be employed in a manner to be mentioned presently.

The plan of removing the well instead of the sick, to prevent the progress of pestilential fevers is not a new one. It has been practised with success in Russia, and it has the following circumstances to recommend

commend it. 1. It will prevent the contagion being spread by the sick in passing through the streets out of the city. 2. It will not be repugnant to humanity; for if the sick be not suddenly destroyed by being informed of the cruel fate which awaits them, they often perish from the motion which is necessary to remove them, or from the anguish of being torn from their families, or friends. 3. The discovery, and declaration of the existence of malignant and contagious fevers will be *early*, and *unequivocal*, when an expulsion from the city will not be dreaded from it, and when the danger of the disease will thereby be lessened, by the ceasing of noises of all kinds in the neighbourhood, and the improbability of the sick creating a reflected atmosphere of contagion from the persons who may be infected by them.

5. After the creation of the temporary desert in the neighbourhood of the sick (which may be done without their knowledge) let the process of nature for destroying contagion and morbid exhalations be imitated. Let artificial showers of rain be poured down by means of fire engines upon the infected houses and upon the adjacent parts of the streets, two or three times a day. This may be done by means of the city engines used for extinguishing fire.

The

The wealthy inhabitants of Smyrna preserve themselves in health by thus wetting their houses, while the plague is destroying thousands of their less opulent, or provident neighbours.

Let it not be inferred from the enumeration of the means of preventing the contagion of this fever, that I admit a contagious nature to be one of its characteristic marks. Far from it. It is an accidental circumstance produced chiefly by the concurrence of the weather. The following statement of facts relative to its contagious character in different seasons, and countries, is the result of much inquiry upon this subject.

1st. It is in no instance contagious in some cases.

2dly. It is sometimes propagated by strangers, to strangers only, in the West Indies.

3dly. It sometimes affects the natives, as well as strangers, in the West India Islands.

4thly. It affects strangers, natives, and negroes in some instances. This was the case in Philadelphia in 1793, and in Norfolk in 1795.

5thly. It affects adults only, and none under puberty, as in Jamaica according to Dr. Hume.

6thly.

6thly. It affects adults and children of all ages. This was evident in Philadelphia in 1793.

7thly. It affects other animals as well as the human species. It affected fowls and ducks in New York in the year 1795, and it affected cattle in Virginia, as I shall say presently, in the year 1794.

8thly. It affects the inhabitants of cities, and not of the country, as in Charleston in the years 1732, 1739, 1745, and 1748, and in Philadelphia in the year 1793.

9thly. It affects the inhabitants of both cities, and country, as in the state of New York in the year 1791.*

From these facts it would appear, that to suppose this fever should infect uniformly in all cases in order to acquire a contagious character, is as absurd as to suppose that cold and heat do not produce inflammatory fevers, because thousands of people are constantly exposed to them, without being indisposed. An aptitude or predisposition from season, climate, or constitution, must concur to render the contagion of this, as well as other malignant fevers sufficiently

* Dr. Addoms's Thesis.

active to produce a disease. As well might a traveller attempt to describe the climate of a new country, from the history of a single season, as a physician fix the character of an epidemic from its appearance in one season, or in one country. To know a disease perfectly, it should be seen, or studied in successive seasons, and in different countries.

It remains now that I mention the origin of this fever. This was very evident. It was produced by the exhalations from the gutters, and the stagnating ponds of water in the neighbourhood of the city. Where there was most exhalation, there were most persons affected by the fever. Hence the poor people, who generally live in the neighbourhood of the ponds in the suburbs, were the greatest sufferers by it. Four persons had the fever in Spruce, between Fourth and Fifth Streets, in which part of the city, the smell from the gutters was extremely offensive every evening. In Water Street between Market and Walnut Streets, many persons had the fever: now the filth of that confined part of the city is well known to every citizen.—I have before remarked that one reason why most of our physicians refused to admit the presence of the yellow fever in the city, was because they could not fix upon a vestige of its being imported. On the 25th of

August

August the Brig Commerce arrived in the river from St. Mark, commanded by Captain Shirtliff. After lying five days at the Fort she came up to the city. A boy who had been shut out from his lodgings, went in a state of intoxication, and slept on her deck, exposed to the night air, in consequence of which the fever was excited in him. This event gave occasion for a few days to a report that the disease was imported, and several of the physicians who had neglected to attend to all the circumstances that have been stated, admitted the yellow fever to be in town. An investigation of this supposed origin of the disease soon discovered that it had no foundation. At the time of the arrival of this ship I had attended nearly thirty persons with the fever, and upwards of an hundred had had it, under the care of other physicians.

Since the publication of my proofs of the generation of the yellow fever, in our city in the year 1793, I have had many reasons to be confirmed in the opinion I then defended. My arguments have carried conviction to the minds of every unprejudiced citizen of the United States. Dr. Priestley, whose knowledge and judgment upon subjects connected with volatile fluids, whether pure or impure, must be admitted by all who know him, has admitted my facts and reasonings, notwithstanding he sat down

down to read them under the influence of prejudices on the other side of the question. Dr. Black the father of modern chemistry, has likewise admitted my opinion of the origin of the yellow fever of 1793, in a conversation with my former pupil Dr. Coxe in Edinburgh. The two following facts will help still further to establish the origin of the bilious fever in its different grades, from vegetable putrefaction, and will shew that in medicine, as well as in government, great events, often spring from little causes. In a letter I received near two years ago from Dr. George Davidson of the island of St. Vincent dated July 22d 1794, is the following communication.

“ The yellow fever is evidently produced by a peculiar state of the air, and by marsh exhalations. The situation of those habitations where it first appears, near to stagnant water, or swamps, point out this to be its origin. The governor’s guard on this Island was stationed in an old bathing house. The stream of water which had run through it, had been diverted from it, but a quantity of mud and filth had been allowed to accumulate in a watering stone trough near the door; in consequence of which several of the guards were seized before morning with the usual symptoms of the yellow fever. Above ten died before the cause was discovered, and im-

mediately upon removing it, the guard became healthy."

The children of a family in this city, were observed for several successive years to be affected by a bilious remitting fever. The physician of the family the late Dr. Phineas Bond, observing no other persons to be affected in the same way in the neighbourhood, suspected that the fever arose from some local cause. He examined the yard belonging to the house, where he found an offensive duck pond. This pond was filled up, and the family remained afterwards free from an annual bilious fever.

Sporadic cases of fever, I believe, are often created by the noxious air of water courses, cellars, and sinks of houses that are equally unsuspected with the filth of the duck pond. A citizen of Philadelphia who had a sink in his kitchen, lost a number of dogs and cats by convulsions. At length one of his servants was affected with the same disorder. This led him to investigate the cause of it. He soon traced it to his sink. By altering its construction, so as to prevent the escape of noxious air from it, he destroyed its unwholesome quality, so that dogs and cats lived in good health afterwards in his kitchen.

In my former publication upon the yellow fever, I mentioned the effects of heavy rains in checking it. But several observations made in the West Indies prove that this effect of rain is not uniform. The following fact extracted from a second letter from Dr. Davidson, dated the 12th of November 1794, will explain the cause of the occasional deviations from the general remark upon this subject.

“ Being ordered (says the Doctor) up to Barbadoes last November upon service, I found that the troops there had suffered considerably by that formidable scourge the yellow fever. The season had been remarkably dry. It was observed that a rainy season contributed to make the troops healthier, excepting at Constitution hill, where the sixth regiment was stationed, and where a heavy shower of rain never failed to bring back the fever after it had ceased for some time. I found the barrack where this regiment was, surrounded by a pond of brackish water, which being but imperfectly drained by the continuance of the drought, the surface was covered with a green scum which prevented the exhalation of marshy exhalation. After a heavy shower of rain this scum was broken, and the miasmata were evolved, and acted with double force in proportion to the time of their retention.”

The generation of the yellow fever in our city was rendered more certain by the prevalence of bilious diseases in every part of the United States, and in several of them, in the grade of yellow fever. It was common in Charleston in South Carolina, where it carried off many people, and where no suspicion was entertained of its being of West India origin. It prevailed with great mortality at that part of the city of Baltimore which is known by the name of Fell's Point, where Dr. Drysdale assures me it was evidently generated. A few sporadic cases of it occurred in New York, which were produced by the morbid exhalation from the docks of that city. Sporadic cases of it occurred likewise in most of the states, in which the proofs of its being generated were obvious to common observation; and where the symptoms of depressed pulse, yellowness of the skin, and black discharges from the bowels and stomach (symptoms which mark the highest grade of bilious remitting fever) did not occur, the fevers in all their forms of tertian, quotidian, colic, and dysentery, were uncommonly obstinate, or fatal in every state in the Union. In New Haven only where the yellow fever was epidemic, it was said to have been imported from Martinique. It is possible this was the case, but I suspect that this fever has often been ascribed to importation, from the circumstance

stance of its appearing first on board of ships, and among sailors who have just arrived from West India voyages, into whom the seeds of the fever are often conveyed by the proximity of the ships to filthy wharves and docks, and in whom they are afterwards excited into action by hard labour or intemperance. But where this is not the case, I believe the disease is sometimes excited by the effluvia of such parts of the cargoes of ships as are capable of putrefaction, and which act with morbid force as soon as they are brought into contact with the air. A solitary instance of a fever which terminated fatally, occurred in this city a few years ago, from the smell of wine, which had become putrid in the hold of a ship, but which was inoffensive until it was removed.

For a while I believed that I was the first person who had asserted that a yellow fever had been generated in Philadelphia; but my friend Mr. Samuel Coates, lately put into my hands a clinical lecture delivered in the Pennsylvania Hospital by the late Dr. Thomas Bond, on the 3d of December 1766, and which was preserved by order of the managers in the third volume of their Minutes, in which the Doctor says that he had seen the yellow fever five times in Philadelphia. The second time he saw it, it was *indigenous*, from evident causes, and

was confined to one square of the city. The locality of this fever designates its putrid origin, and bilious character. Bilious fevers of all degrees are often limited in their progress by winds, trees, hills, houses, and other circumstances. Dr. Bond mentions in the same lecture that an intermittent prevailed in the year 1765 from the southern parts of Philadelphia to Georgia, affecting two-thirds of all the inhabitants in that extensive tract of country; and yet at this time the city of Philadelphia, except its southern suburbs, was healthy. The break-bone, or bilious fever of 1780, was confined chiefly to the eastern and southern streets of Philadelphia.

The year 1795 furnished several melancholy proofs of the American origin of the yellow fever. All the Physicians and citizens of New-York and Norfolk agree in its having been generated in their respective cities last year. It prevailed with great mortality at the same time in the neighbourhood of the Lakes, and on the waters of the Genesee river in the state of New-York. From its situation it obtained the name of the Lake and Genesee fever. It was so malignant in some parts of that new country as to affect horses.

I have been frequently rebuked by my friends for my attempts to prove that the yellow fever is one of

of the indigenous diseases of our country, inasmuch as the opinion exposed me to much unnecessary persecution, and thereby created an opposition to the remedies I had used and recommended for the cure of that disorder. I have constantly answered these remonstrances by declaring the establishment of my opinion to be deeply interesting to mankind, and particularly to the inhabitants of the United States, where an idea that the yellow fever could exist among us only by importation has, until lately, very generally prevailed.

Climates and seasons are not necessarily sickly. The sun would seldom smite by day, nor the moon by night, were pains taken to prevent the accumulation and putrefaction of those matters which occasion malignant bilious fevers. Those parts of the West India islands which are removed from the neighbourhood of marsh exhalations, are uncommonly healthy. Of this Dr. Lind has given us many striking instances. Dr. Chisholm has lately added his testimony to the truth of the same observation. * It is further confirmed by the following extract of a letter from Dr. Davidson, dated November 12th, 1794. "I have mentioned an instance (says the Doctor) of the remarkable good

* Introduction, p. 30.

state of health which the 66th regiment enjoyed at St. Vincents for several years, upon a high hill above the town, removed from all exhalations, and in a situation kept at all times cool by the blowing of a constant trade wind. They did not lose during eighteen months above two or three men (the regiment was completed to the peace establishment), and during eight years, they lost only two officers, one of whom, the quarter master, resided constantly in town, and died from over fatigue ; the other arrived very ill from Antigua, and died within a few days afterwards.” But this is not all. There are many proofs that uncommon degrees of longevity as well as health, are to be met with in all the West India Islands.

These facts are important, inasmuch as they manifest the goodness of Heaven in having surrendered every part of the globe to man in a state capable of being inhabited and enjoyed. They shew moreover the connection between health and longevity, and the reason and labour of man.

Under the impression of this sentiment, it would be criminal in me to cease to propagate the opinion of the domestic origin of the yellow fever. It leads to the annihilation of more human misery than is produced by war or famine. From the success which

which has attended perseverance in inculcating opinions equally odious and unpopular, I am satisfied that truth, upon this subject, must prevail, and that I shall sooner or later be believed and forgiven.

To every natural evil Heaven has discovered or prepared an antidote. The yellow fever furnishes no exception to this remark. The means of preventing it are as much under the power of human reason and industry, as the means of preventing the evils of lightning and common fire. I am so satisfied of the truth of this opinion, that I look for a time, when our courts of law shall punish cities and villages for permitting a single case of bilious or yellow fever to exist within their jurisdiction.

I shall conclude this account of the origin of the yellow fever by relating a fact which serious and contemplating minds will apply to a more interesting subject.

Notwithstanding the numerous proofs of the prevalence of the yellow fever in Philadelphia in the year 1794 which have been mentioned, there are many thousands of our citizens, and a majority of our physicians, who do not believe that a case of it existed at that time in the city; nor is a single record of it to be met with in any of the newspapers,

or other public documents of that year. Let us learn from this fact, that the denial of events, or a general silence upon the subject of them, is no refutation of their truth, where they oppose the pride or interests of the learned or the great.

What the exact state of the atmosphere is, which disposes to malignant fevers, is difficult to determine. Two things are obvious with respect to it. 1. It pervades at the same time a great extent of country. This was evident in the years 1793 and 1794 in the United States. During the same year the yellow fever was epidemic in most of the West India islands. Many of the epidemics mentioned by Dr. Sims * affected in the same years the most remote parts of the continent of Europe. Even the ocean partakes of a morbid constitution in its atmosphere, and diseases at sea, sympathise in violence with those of the land, at an immense distance from each other. This appears in a letter from a surgeon on board a British ship of war to Mr Gooch, published in the third volume of his medical and surgical observations. 2. This predisposing state of the atmosphere to induce malignant diseases continues for several years, under all the circumstances of wet and dry, and of hot and cold weather.

* Medical Memoirs, Vol. I.

The weather in 1794 differed materially from the weather in 1793, in the United States, in each of the above particulars ; and yet the atmosphere continued to maintain that quality which predisposes to a malignant state of bilious fever.

This morbid peculiarity in the air is taken notice of by Dr. Sydenham, and acknowledged by him as an obscure circumstance in the history of epidemics. It resembles a solitary fever and a general epidemic, in beginning with violence, and gradually wasting its inflammatory force by time. To what change in the state of the air, or to what impregnation of it, shall we attribute its disposition to impart a greater degree of malignity or inflammatory diathesis to diseases at one time than at another ? Hippocrates, who felt the influence of this diathesis in his practice, ascribes it to “ a divine something ” in the atmosphere. Dr. Sydenham attributes it to certain mineral vapours exhaled from the bowels of the earth. I have suspected it to be the effect of a preternatural quantity of oxygen in the atmosphere. I know that the experiments of Mr. Sheele and Mr. Cavendish prove that the proportions of azote and oxygen are the same in different situations and different kinds of weather ; but as their experiments were not made at a time when diseases of a high degree of inflammatory action were epidemic, I do not

not think they militate against my hypothesis. I lament that the want of eudiometrical instruments prevented my deciding this question by actual experiments, during the prevalence of our late inflammatory epidemics; but the following facts will, I hope, render the hypothesis probable. 1. The disease was most violent in those persons in whom there is supposed to be the greatest quantity of oxygen, viz. the young and the robust, and more especially those who live freely. 2. It affected those persons most violently who had lately arrived from places or situations in which oxygen abounded. Country people suffered more, under equal circumstances, from the fever, than the citizens of Philadelphia; but it was most violent in persons who, after spending four or five weeks at the sea-shore, returned to the city in the months of September and October. This was the case with Peter Brown and Henry Clymer, who sickened soon after they inhaled the atmosphere of our city, and were both affected by the fever in a very high degree. I should have suspected that the uncommon malignity of the disease in those two gentlemen arose from the indolence and plentiful diet which constitute part of the pleasure of an excursion to the sea-shore, had I not met with several cases of equal violence in persons who had just arrived from sea voyages, under circumstances by no means apt to produce inflammable

diathesis

diathesis in the blood-vessels. 3. The colour of the blood in most cases of yellow fever, as I shall say hereafter, was such as is imparted by oxygen. It is possible the air may communicate as much oxygen to the blood, as is sufficient to produce a predisposition to inflammatory diseases, and yet refuse to discover itself in an undue quantity to an eudiometrical experiment; for Dr. Beddoes, to whose authority upon this subject I yield my judgment, says, and I believe very justly, in a letter I received from him, dated May 3d, 1795, that "he has no doubt, but a small excess of oxygen is equal to the production of highly inflammatory action."

If it should be found hereafter, that no excess in the quantity of oxygen in the atmosphere takes place during the prevalence of malignant fevers, I shall still suspect it to be their predisposing cause, and that it may possibly be derived from the alienments and fruits of the season; for all writers take notice of a connection between great and mortal epidemics, and a deviation in quality or quantity from common years in the vegetable products of the earth.

The exhalations or gases, which by acting upon an inflammatory predisposition produce a yellow fever, have been called by different names, according

ing as they act in a simple or compound state. They all act as stimulants upon the whole system, and in a more especial manner upon the liver. This is evident, not only in the affections of that viscus in bilious fevers, but in the morbid appearances of the liver in cattle that feed in marshy pasture in the fall of the year. These appearances were so universally admitted to be the effect of an unwholesome atmosphere among the ancients, that they inspected the livers of animals, in order to determine on the healthy or unhealthy situation of the spots on which they wished to live.

Dr. Cleghorn describes a morbid state of the liver in cattle in an unhealthy part of the island of Minorca. Dr. Grainger takes notice of the same appearances in the livers of several domestic animals in Holland, in the year 1743. * But our own country has furnished facts to illustrate the truth of this observation. Mr. James Wardrobe, near Richmond in Virginia, informed me, that in the month of August 1794, at a time when bilious fevers were prevalent in the neighbourhood, his cattle were seized with a disease which is known by the name of the yellow water, and which appears to be a true yellow fever. They were attacked with a staggering.

* Cap. III.

Their

Their eyes were muddy or ferocious : a costiveness attended in all cases. It killed in two days. Fifty-two of his cattle perished by it. Upon opening several of their dead bodies, he found the liver swollen and ulcerated. The blood was dissolved in the veins. In the bladder of one of them he found thirteen pints of blood and water. Curiosity led him to inoculate two of his calves from the blood of a diseased animal. They both sickened in eight days, and after being lightly indisposed, they both recovered.

I have avoided deciding upon the specific nature of the exhalations which induce diseases : This subject has been pursued with great ardor by Professor Mitchell of New-York. His accurate knowledge of the laws of the animal economy, added to the records of the late unsuccessful application of the principles of electricity and fixed air to medicine, will, I hope, defend him from an undue application of his ingenious discoveries to the theory and practice of physic.

It is no objection to the influence of these exhalations in disordering the liver, that the cattle killed and sold in the Philadelphia market in the autumns of 1793 and 1794 exhibited, in only one instance that has come to my knowledge, the least mark of disease ;

ease; for those cattle fed in pastures previously to their being killed, in which no exhalation took place. This was evident from the uncommon healthiness of the people in that part of the neighbourhood of the city, from whence the cattle were brought a day or two before they were killed.

Thus I have endeavoured to fix the predisposing and remote causes of the yellow fever in our country. The remote cause is sometimes so powerful, as to become an exciting cause of the disease; but in general, both the predisposing and remote causes are harmless in the system, until they are roused into action by some exciting cause.

Before I proceed to mention the remedies which were used in the cure of the fever which has been described, I shall subjoin scales of the relative contagious nature, of the distance of infection, and of the mortality of the most common contagious fevers, beginning with those which predominate under each head.

I.

A scale of the extent or *universality* of contagious fevers.

1. Small-pox.
- 2 Measles.

4

3. In-

3. Influenza.
4. Plague.
5. Bilious fever in the form of yellow fever in certain seasons and places.
6. Cynanche scarlatina.
7. Cynanche maligna.
8. The dysentery.
9. The common bilious remitting fever.
10. The common intermitting fever.

The influence of climate, weather and habit of body, sometimes vary this scale, but the relative order in which the above fevers affect a greater or less number of people, I believe in common years, and in most countries, accords with the observations of most physicians.

II.

Scale of the relative *distance* at which contagious fevers propagate themselves.

1. Small-pox.
2. Measles.
3. Influenza.
4. Yellow fever.
5. Plague.
6. Jail fever.
7. Cynanche maligna.
8. Cynan-

8. Cynanche scarlatina.
9. Dysentery.
10. The common intermitting fever.

III.

Scale of the relative *mortality* of contagious diseases.

1. The plague.
2. The yellow fever.
3. The jail fever ;
4. The cynanche maligna.
5. The dysentery.
6. The natural small-pox.
7. The cynanche scarlatina.
8. The influenza and measles.
9. The common bilious fever.
10. The common intermitting fever.

The above scale represents the relative order of contagious fevers when left to themselves. Difference of climate, season, habit of body, and above all, difference of treatment greatly vary their relative mortality. For example, in Jamaica a fourth and in St. Domingo one half sometimes die of the yellow fever who take bark and wine, whereas in Philadelphia the mortality, as will be shewn hereafter does not exceed more than one in fifty, where depleting remedies are used in their proper extent.

Methoda

Of the Method of Cure.

THE remedies employed for the cure of this fever, were the same that I employed the year before. I shall only relate such effects of them as tend more fully to establish the practice adopted in the year 1793, and such as escaped my notice in my former observations upon those remedies. My method of cure consisted

I. In the abstraction of the stimulus of blood, and heat from the whole body, and of bile, and other acrid humors from the bowels, by means of the following remedies:

1. Bleeding.

2. Purging.

3. Cool air, and cold drinks.

4. Cold water applied to the external parts of the body, and to the bowels by means of glysters.

II. In creating a diversion of congestion, inflammation, and serous effusion, from the brain and viscera to the mouth, by means of a salivation, and to the external parts of the body, by means of blisters.

III. In restoring the strength of the system, by tonic remedies.

I proceed to make a few remarks upon the remedies set down under each of the above heads.

OF BLEEDING.

I HAVE taken notice that this fever differed from the fever of 1793, in coming forward in July and August with a number of paroxysms, which refused to yield to purging alone. I therefore began the cure of every case I was called to by bleeding.

I shall mention the effects of this remedy, and the circumstances, manner, and degrees in which I used it occasionally, in this fever, in my defence of blood-letting. Under the present head I shall only furnish the reader with a table of the quantity of blood

drawn

drawn from a number of my patients in the course of the disease. From several of them the quantity set down, was taken in three, four, and five days. I shall afterwards describe the appearances of the blood.

Month.	Patients.	Quantity ounces.	Number of times bled.
August.	Peter Denham.	50	5
	Mrs. Bruce.	70	7
	Andrew Gribble aged 15 years.	50	5
	John Madge.	150	12
	Peter Brown.	80	8
September.	Mrs. Gardiner.	80	7
	Miss Sally Eyre.	80	9
	Mrs. Gass.	50	3
	Richard Wells's maid.	50	1
	100	10	
	Mr. Norval.	100	9
	Mr. Harrison.	90	9
	Henry Clymer.	80	8
October.	Mrs. Mitchell.	120	13
	Mrs. Lenox.	80	7
	Mrs. Kappé.	140	14
	Rev. Dr. Magaw's maid.	100	10
	Miss Hood.	100	10
	Mrs. Vogles.	70	5
	Guy Stone.	100	9
	Benj. Hancock.	100	10
	Mr. Benton.	130	13
	Mrs. Fries.	150	15
	Mrs. Garrigues,	80	7
1795			Three
January.			

Three of the women whose names I have mentioned, were in the advanced stage of pregnancy, viz. Mrs. Gardiner, Mrs. Gafs, and Mrs. Garrigues. They have all since borne healthy children. I have omitted the names of above one hundred persons who had the fever, from whom I drew thirty or forty ounces of blood by two or three bleedings. I did not cure a single person without at least one bleeding.

It is only by contemplating the extent in which it is necessary to use this remedy, in order to overcome a yellow fever, that we can acquire just ideas of its force. Hitherto this force has been estimated by no other measure than the grave, and this we know puts the strength of all diseases upon a level.

The blood drawn in this fever exhibited the following appearances.

1. It was dissolved in a few instances.
2. The crafamentum of the blood was so partially dissolved in the serum as to produce an appearance in the serum resembling the washings of flesh in water.
3. The serum was so lightly tinged of a *red* colour as to be perfectly transparent.
4. The

4. The serum was in many cases of a deep *yellow* colour.

5. There was in every case in which the blood was not dissolved, or in which the second appearance that has been mentioned did not take place, a beautiful scarlet coloured sediment in the bottom of the bowl, forming lines, or a large circle. It seemed to be a tendency of the blood to dissolution. This state of the blood occurred in almost all the diseases of the last two years, and in some in which there was not the least suspicion of the miasmata or contagion of the yellow fever.

6. The crassamentum generally floated in the serum, but it sometimes sunk to the bottom of the bowl. In the latter case, the serum had a muddy appearance.

7. I saw but one case in which there was not a separation of the crassamentum and serum of the blood. Its colour in this case was of a deep scarlet. In the year 1793 this appearance was very common.

8. I saw one case in which the blood drawn, amounting to 14 ounces, separated partially, and was of a deep *black* colour. This blood was taken from Mr. Norval a citizen of North Carolina, who had

been infected with the fever by sleeping in the same room with Mr. Harrison, a citizen of Virginia.

9. There was in several instances a transparent jelly-like pellicle which covered the crassamentum of the blood, and which was easily separated from it, without altering its texture. It appeared to have no connection with the blood.

10. The blood towards the crisis of the fever in many people exhibited the usual forms of inflammatory crust. It was cupped in many instances.

11. After the loss of 70 or 80 ounces of blood, there was an evident disproportion of the quantity of crassamentum to the serum. It was sometimes less by one half, than in the first bleedings.

Under this head, it will be proper to mention that the blood when it happened to flow along the external part of the arm in falling into the bowl, was so warm as to excite an unpleasant sensation of heat in several patients.

To the appearances exhibited by the blood to the eye, I shall add a fact communicated to me by a German bleeder who followed his business in the city during the prevalence of the fever in 1793.

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He informed me that he could distinguish a yellow fever from all other states of fever, by a peculiar smell which the blood emitted while it was flowing from a vein. From the certainty of his decision in one case which came under my notice, before a suspicion had taken place of the fever being in the city, I am disposed to believe that there is a foundation for his remark.

2. OF PURGING.

I HAVE but little to add under this head to the observations that I have made upon this remedy in the year 1793. I purged with jalap, calomel, and gamboge until I obtained large and dark-coloured stools ; after which I kept the bowels gently open every day with castor oil, cremor tartar, or Glauber salts. I gave calomel in much larger quantities than I did the year before. John Madge took nearly 150 grains of it in six days. I should have thought this a large quantity, had I not since read that Dr. Chisholm gave 400 grains of it to one patient in the course of his fever, and 50 grains to another at a single dose, three times a-day. I found strong mercurial purges to be extremely useful in the

the winter months, when the fever put on symptoms of pleurify. I am not singular in ascribing much to the efficacy of purges in the bilious pleurify. Dr. Desportes tells us, that he found the pleurify of St. Domingo, which was of the bilious kind, to end happily in proportion as the bowels were kept constantly open.* Nor am I singular in keeping my eye upon the original type of a disease, which only changes its symptoms with the weather or the season, and in treating it with the same remedies. Dr. Sydenham bled as freely in the diarrhoea of 1668, as he had done in the inflammatory fever of the preceding year. † How long the pleurifies of winter, in the city of Philadelphia, may continue to retain the bilious symptoms of autumn, which they have assumed for three years past, I know not; but the late Dr. Fayssaux of South Carolina informed me, that for many years he had not seen a pleurify in Charleston with the common inflammatory symptoms which characterized that disorder, when he was a student of medicine. They all now put on bilious symptoms, and require strong purges to cure them. The pleurifies which the late Dr. Chalmers supposes he cured by purging, were probably nothing but bilious fevers, in which the cool weather had excited some pleuritic symptoms.

* P. 140.

† Wallis's edition, p. 211. Vol. I.

3. I have nothing to add to the observations I have elsewhere published upon the efficacy of cool air and cold drinks in this fever. They were both equally pleasant and useful, and contributed, with cleanliness, very much to the success of my practice.

4. Cold water applied to the external parts of the body, and injected into the bowels by way of glyster, did great service in many cases. John Madge found great relief from cloths dipped in cold water and applied to the lower part of his belly. They eased a pain in his bowels, and procured a discharge of urine. A throbbing and most distressing pain in the head, was relieved by the same remedy in Mrs. Vogles and Mrs. Lenox. The cloths were applied for three successive days and nights to Mrs. Lenox's head, during an inflammation of her brain, which succeeded her fever, and were changed during the greater part of the time, every ten or fifteen minutes. In 1795 I increased the coldness of pump water when used in this way, by dissolving ice in it, and in some cases I applied powdered ice in a bladder to the head, with great advantage.

The following facts will shew the good effects of cold water in this, as well as other fevers of too much action. In the afternoon of one of those days in which my system was impregnated with the contagion

gion of the yellow fever, I felt so much indisposed that I deliberated whether I should go to bed, or visit a patient about a mile in the country. The afternoon was cool and rainy. I recollect at this time a case related by Dr. Daignan, a French physician, of a man who was cured of the plague by being forced to lie all night in an open field in a shower of rain. I got into my chair, and exposed myself to the rain. It was extremely grateful to my feelings. In two hours I returned, when to my great satisfaction I found all my feverish symptoms had left me, nor had I the least return of them afterwards. Dr. Caldwell, who acted as a surgeon of a regiment in the expedition against the insurgents in the western counties of Pennsylvania, furnished me, in a letter dated from Bedford, October 20th, 1794, with an account of his having been cured of a fever by a more copious use of the same remedy. "I was (says the Doctor) to use a vulgar expression, *wet to the skin*, and had no opportunity of shifting my clothes for several hours. In consequence of this thorough bathing, and my subsequent exposure to a cool air, I was relieved from every symptom of indisposition in a few hours, and have enjoyed more than my usual stock of health ever since."

The efficacy of cold water in preventing and curing inflammation, may be conceived from its effects

fects when used with mud or clay, for obviating the pain and inflammation which arise from the sting of venomous insects. The same remedy applied for half an hour has lately, it is said, been equally effectual in preventing the deleterious effects of the bite of a rattle-snake.

II. The good effects I had observed from a ~~salivation~~ in the yellow fever of 1793, induced me to excite it as early as possible in all those cases which did not yield immediately to bleeding and purging. I was delighted with its effects in every case in which I used it. These effects were as follow:

1. It immediately attracted and concentrated in the mouth, all the scattered pains of every part of the body.
2. It checked a nausea and vomiting.
3. It gradually, when it was copious, reduced the pulse, and thereby prevented the necessity of further bleeding or purging.

I wish it were possible to render the use of this remedy universal in the treatment of malignant fevers. Dr. Chisholm, in his Account of the Boul-

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Jaundice, has done much to establish its safety and efficacy. It is a rare occurrence for a patient that has been sufficiently bled and purged, to die after a salivation takes place. The artificial disease excited by the mercury, suspends or destroys disease in every part of the body. The occasional inconveniences which attend it, are not to be named with its certain and universal advantages. During the whole of the late season in which the yellow fever prevailed, I saw but two instances in which it probably loosened or destroyed the teeth. I am not satisfied that the mercury was the cause of the injury or loss of those teeth ; for who has not seen malignant fevers terminate in ulcers, which have ended in the erosions of bony parts of the body ?

It has been justly remarked, that there can be but one action at a time in the blood-vessels. This was frequently illustrated by the manner in which mercury acted upon the system in this fever. It seldom salivated until the fever intermitted or declined. I saw several cases in which the salivation came on during the intermission, and went off during its exacerbation ; and many, in which there was no salivation until the morbid action had ceased altogether in the blood-vessels, by the solution of the fever. It is because the action of the vessels in epilepsy and pulmonary consumption surpasses the stimulus

mulus of the mercury, that it is so difficult to excite a salivation in both those disorders.

Let not the advocates for the healing powers of nature complain of a salivation as an unnatural remedy in fevers. Dr. Sydenham speaks in high terms of it in the fever of 1670, 1671, and 1672, and says that it cured it when it was so malignant, as to be accompanied by purple spots on the body.*

BLISTERS, when applied at a *proper* time, did great service in this fever. This time was, when the fever was so much weakened by evacuations, that the artificial pain excited by the blisters destroyed, and, like a conductor, conveyed off, all the natural pain of the body. It is from ignorance, or inattention to the proper stage of fevers in which blisters have been applied, that there have been so many disputes among physicians respecting their efficacy. When applied in a state of great arterial action, they do harm: When applied after that action has nearly ceased, they do little or no service. I have called the period in which blisters are useful, the *blistering point*. In bilious fevers this point is generally circumscribed within eight-and-forty hours.

* Vol. II. p. 212.

The effects of blisters were as follow :

1. They concentrated, like a salivation, all the scattered pains of the body; and thereby
2. Reduced the pulse in force and frequency.
3. They instantly checked a sickness at the stomach and vomiting.
4. They often induced a gentle moisture upon the skin.

I found it of little consequence to what part of the body the blisters were applied; for I observed a pain in the head, and even delirium, to be as speedily and certainly cured by blisters upon the wrists, as they were by a large blister to the neck.

III. After the reduction of the morbid action of the blood-vessels, by means of the remedies which have been mentioned, I seldom made use of any other tonic than a nourishing and gently stimulating diet. This consisted of summer fruits, bread and milk, chicken broth, the white meats, eggs, oysters, and malt liquors, more especially porter. I made many attempts to cure this fever when it appeared in the form of a simple intermittent, by means of

BARK, without malignant symptoms, but always, except in two instances, without success; and in them it did not take effect until after bleeding. In several cases it evidently did harm. I should have suspected my judgment in these observations respecting this medicine, had I not been assured by Dr. Griffitts, Dr. Physick, and Dr. Woodhouse, that it was equally ineffectual in their practice, in nearly all the cases in which they gave it, and even where blood-letting had been premised. Dr. Woodhouse saw a case in which near a pound of bark had been taken without effect; and another, in which a fatal dropsy succeeded its use. Dr. Griffitts excepted from his testimony against the bark, the cases of seven persons from the country, who brought the seeds of the intermitting fever with them to the city. In them, the bark succeeded without previous bleeding. The facility with which these seven cases of intermitting fever were cured by the bark, clearly proves that fevers of the same season differ very much, according to the nature of the exhalations which excite them. The intermittents in these strangers were excited by miasma of less force than that which was generated in our city, in which, from the greater heat of the atmosphere, and the more heterogeneous nature of the putrid matters which stagnate in our ponds and gutters, the exhalation probably possesses a more active and

stimulating quality. Thus the mild remittents in June and in the beginning of July, which were produced by the usual filth of the streets of Philadelphia, in the year 1793, differed very much from the malignant remitting yellow fever which was produced by the stench of the putrid coffee a few weeks afterwards.

Sir John Pringle long ago taught the inefficacy of bark in certain bilious fevers. But Dr Chisholm has done great service to medicine by recording its ill effects in the Boullam fever. "Head ach, (says the Doctor) a heavy dull eye, with a considerable protrusion from its orbits, low spirits, thirst, and a total want of appetite, were the general consequences of the treatment with bark without the previous antiphlogistic."

I have mentioned a case of internal dropfy of the brain having been produced by the improper use of the bark in a son of Mr. Coates. I have no doubt but this disorder, as also palsey, and consumption, obstructions of the liver and bowels, and dropsies of the belly and limbs, are often induced by the use of the bark during an inflammatory state of the blood-vessels. It is to be lamented that the association of certain diseases and remedies in the minds of physicians, becomes so fixed, as to refuse to yield

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to the influence of reason. Thus pain and opium, dropsy and foxglove, low spirits and assafœtida, and above all, an intermitting fever and bark, are all connected together in common practice as mechanically, as the candle and the snuffers are in the mind of an old and steady house servant. To abolish the mischief of these mechanical associations in medicine, it will be necessary for physicians to prescribe only for the different states of the system.

Finding the bark to be so universally ineffectual or hurtful, I substituted Columbo root, the Caribbean bark and several other bitters in its place, but without success. They did less harm than the Jesuit's bark, but they did not check the return of a single paroxysm of fever.

I know that bark was given in this fever in some instances in which the patients recovered; but they were subject during the winter, and in the following spring, to frequent relapses, and in some instances to affections of the brain and lungs. In the highest grade of the fever it certainly accelerated a supposed putrefaction of the blood, and precipitated death. The practice of physicians who create this gangrenous state of fever by means of the bark, resembles the conduct of a horse, who attempts by pawing to

remove his shadow in a stream of water, and thereby renders it so turbid that he is unable to drink it.

Should the immediate success of tonic, and depleting remedies in destroying the fever be equal, the effects of the former upon the constitution cannot fail of being less safe than the latter remedies. They cure by overstraining the powers of life. There is the same difference therefore between the two modes of practice, that there is between gently lifting the latch of a door, and breaking it open in order to go into a house.

WINE was hurtful in every case of yellow fever in which it was given while there were any remains of inflammatory action in the system. I recollect that a few spoonfuls of it, which Mr. Harrison of Virginia took in the depressed state of his pulse, excited a sensation in his stomach which he compared to a fire. Even wine-whey, in the excitable state of the system induced by this fever, was sometimes hurtful. In a patient of Dr. Physick who was on the recovery, it produced a relapse that had nearly proved fatal in the year 1795. Dr. Desperrieres ascribes the death of a patient to a small quantity of wine given to him by a black nurse.*

* Vol. II. p. 108.

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These facts are important, inasmuch as wine is a medicine which patients are most apt to use in all cases, without the advice of a physician.

I observed OPIUM to be less hurtful in this fever than it was in the fever of 1793. I administered a few drops of laudanum, in one case in the form of a glyster in a violent pain of the bowels, with evident advantage, before the inflammatory action of the blood vessels was subdued. In this way I have often obtained the composing effects of laudanum where it has been rejected by the stomach. But I gave it sparingly, and in small doses only, in the early stage of the fever. John Madge, whose pains in his bowels were often as exquisite as they are in the most acute colic, did not take a single drop of it. I used no anodyne in his case but bleeding, and applications of cold water to the inside and outside of his bowels. After the fever had passed the seventh day, and had been so far subdued by copious evacuations as to put on the form of a common inflammatory intermittent, I gave laudanum during the intermissions of the fever with great advantage. In some cases, it suddenly checked the paroxysms of the fever, while in many more it only moderated them, but in such a manner, that they wore themselves away in eight or ten days. One of my female patients who had taken bitters of every kind, with-

out effect to cure a tertian which succeeded a yellow fever, took a large dose of laudanum in the interval of her paroxysms to cure a tooth ach. To her great surprise it removed her tertian. The effects of laudanum in this fever were very different from those of bark. Where it did no service, it did not, like the bark do any harm.

Perhaps this difference in the operation of those two medicines depended upon the bark acting with an astringent, as well as stimulating power chiefly upon the blood vessels, while the action of the opium was more simply stimulating, and diffused at the same time over all the systems of the body.

I shall say in another place that I sometimes directed a few drops of laudanum to be given in that state of extreme debility which succeeds a paroxysm of fever, with evident advantage.

NITRE, so useful in common inflammatory fevers, was in most cases so offensive to the stomach in this fever, that I was seldom able to give it. Where the stomach retained it, I did not perceive it to do any service.

ANTIMONIALS were as ineffectual as nitre in abating the action of the sanguiferous system, and in producing

producing a sweat. I should as soon expect to compose a storm by music, as to cure a yellow fever by such feeble remedies.

Thus have I finished the history of the symptoms, origin, and cure of the yellow fever as it appeared in Philadelphia in 1794 and in the winter of 1795. The efficacy of the remedies which have been mentioned, was established by almost universal success. Out of upwards of 200 patients to whom I was called in the first stage of the fever between the 12th of June 1794 and the first of April 1795, I lost but four persons in whom the unequivocal symptoms had occurred, which characterise the first grade of the disease.

It will be useful, I hope, to relate the cases of the patients whom I lost, and to mention the causes of their deaths. The first of them was Mrs. Gavin. She objected to a fifth bleeding in the beginning of a paroxysm of her fever, and died from the want of it. Her death was ascribed to the frequency of her bleedings by the enemies of the depleting system. It was said that she had been bled ten times, owing to ten marks of a lancet having been discovered on her arms after death, five of which were occasioned by unsuccessful attempts to bleed her. She died with the usual symptoms of congestion in her brain.

Mr. Marr, to whom I was called on the first day of his disorder, died in a paroxysm of his fever which came on in the middle of the 7th night, after six bleedings. I had left him the night before nearly free of fever, and in good spirits. He might probably have been saved, (humanly speaking) by one more bleeding in the exacerbation of what appeared to be the critical paroxysm of his fever.

Mr. Montford of the State of Georgia died under the joint care of Dr. Physick and myself. He had been cured by plentiful bleeding, and purging, but had relapsed. He appeared to expire in a fainty fit in the first stage of a paroxysm of the fever. Death from this cause (which occurs most frequently where bloodletting is not used) is common in the yellow fever of the West Indies. Dr. Bisset in describing the different ways in which the disease terminates fatally says. “ In a few cases, the patient is carried off by an *unexpected syncope.*” *

A servant of Mr. Henry Mitchell, to whom I was called in the early stage of his disorder, died in consequence of a sudden effusion in his lungs which had been weakened by a previous pulmonary complaint.

* *Medical Essays and Observations*, p. 28.

I wish the friends of bark and wine in the yellow fever, or of *moderate* bleeding with antimonial medicines, would publish an account of the number of their deaths by the fever, within the period I have mentioned, and with the same fidelity I have done. The contrast would for ever decide the controversy in favour of copious depletion. The mortality under the tonic mode of practice may easily be conceived from the acknowledgement of one of the gentlemen who used it, but who premised it, in many cases, by two and three bleedings. He informed Dr. Woodhouse that out of twenty-seven patients whom he had attended in the yellow fever, he had saved but nine. Other practitioners were, I believe, equally unsuccessful in proportion to the number of patients whom they attended. The reader will not admit of many deaths having occurred from the diseases (formerly enumerated) to which they were ascribed, when he recollects that even a single death from most of them, in common seasons, is a rare occurrence in the practice of regular bred physicians.

In answer to the account I have given of the mortality of the fever in 1794, it will be said, that 30 persons died less in that year, than in the healthy year of 1792. To account for this, it will be necessary to recollect that the inhabitants of Philadelphia

phia were reduced in number upwards of 4000, in the year 1793 and of course that the proportion of deaths was greater in 1794 than it was in 1792 although the number was less. It is remarkable that the burials in the strangers' grave yard amounted in the year 1792 to but 201, whereas in 1794 they were 676. From this it appears, that the deaths must have been very numerous among new comers (as they are sometimes called) in the year 1794 compared with common years. Now this will easily be accounted for when we recollect, that these people who were chiefly labourers, were exposed to the constantly exciting causes of the disease, and that in all countries they are the principal sufferers by it.

But in order to do justice to this comparative view of the mortality induced by the yellow fever in the year 1794, it will be necessary to examine the bill of mortality of the succeeding year. By this it appears that 2274 persons died in 1795, making 1139 more than died in 1794. The greatness of this mortality, I well recollect, surprized many of the citizens of Philadelphia who had just passed an autumn which was not unusually sickly, and who had forgotten the uncommon mortality of the months of January, February and March, which succeeded the autumn of 1794.

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It will probably be asked, how it came to pass, that I attended so many more patients in this fever than any of my brethren. To this I answer, that since the year 1793 a great proportion of my patients have consisted of strangers, and of the poor; and as they are more exposed to the disease than other people, it follows, that of the persons affected by the fever, a greater proportion must have fallen to my share as patients, than to other physicians. My ability to attend a greater number of patients than most of my brethren, was facilitated by my having at the time of the fever, several ingenious and active pupils, who assisted me in visiting and prescribing for the sick. These pupils were, Ashton Alexander (now physician at Baltimore), John Otto, Nathaniel Potter (now physicians in Philadelphia), and Gilbert Watson.

The antiphlogistic remedies were not successful in Philadelphia, in the yellow fever, in my hands alone. They were equally, and perhaps more so, in the hands of my friends Dr. Griffitts, Dr. Physick, Dr. Dewees, and Dr. Woodhouse.

They were moreover successful at the same time in New Haven, Baltimore, and in Charleston in South Carolina. Eighteen out of twenty died of all who took bark and wine in New Haven, but only

only one in ten, of those who used the depleting medicines. In a letter from Dr. Brown, a physician of eminence in Baltimore, dated November 27th, 1794, he says, "of the many cases which fell to my care, two only proved mortal where I was called on the first day of the disease, and had an uncontroled opportunity to follow my judgment. Where salivation took place, I had no case of mortality; and in two of those cases a black vomiting occurred." Dr. Ramsay of Charleston, in a letter to one of his friends in this city, dated October 14th, 1794, subscribes to the efficacy of the same practice in a fever which prevailed at that time in Charleston, and which, he says, resembled the yellow fever of Philadelphia in the year 1793.

But the success of the depleting system was not confined to the United States. In a letter before quoted, which I received from Dr. Davidson of St. Vincents, dated July 22d, 1794, there is the following testimony in favour of evacuations from the blood-vessels, bowels, and salivary glands.

"Where the fever comes on with great determination to the head, and an affection of the stomach, in consequence of that determination, violent head ach, redness of the eyes, turgescence of the face, impatience of light, &c. attended with a full

a full and hard pulse, *blood-letting* should be employed *freely* and *repeatedly*, cold applications should be applied to the head, and purging medicines should be employed. As a purge, *calomel* has been used with the greatest advantage, sometimes by itself, but most frequently combined with some active purgative medicine, such as *jalap*. From some peculiarity in the disease, an uncommon quantity of the calomel is necessary to affect the bowels and salivary glands. As I found a small quantity of it did not produce the effect I wished for promptly, I have gradually increased the quantity, until I now venture to give *ten* grains of it, combined with five of *jalap*, every *two* hours until stools are procured. The calomel is then given by itself.

“ The patients have generally an aversion to wine. The bark is seldom found of much advantage in this state of the fever, and frequently brought on a return of the vomiting. I preferred to it, in a remission of the symptoms, a vinous infusion of the *quassia*, which sat better upon the stomach.”

In the island of *Jamaica*, the depleting system has been divided. It appears from several publications in the *Kingston* papers, that Dr. *Grant* had adopted *blood-letting*, while most of the physicians

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of the island rest the cure of the yellow fever upon strong mercurial purges. The ill effects of *moderate* bleeding appear to have thrown the lancet into disrepute ; and the balance of success, from those publications, is evidently in favour of simple purging. I have no doubt of the truth of the above statement of the controversy between the exclusive advocates for bleeding and purging ; and I think the superior efficacy of the latter remedy may be explained in the following manner.

In warm climates the yellow fever is generally, as it was in Philadelphia in the month of August and in the beginning of September 1793, a disease of but two or three paroxysms. It is sometimes, I believe, only a simple ephemera. In these cases, purging alone is sufficient to reduce the system, without the aid of bleeding. It was found to be so, until the beginning of September in 1793, in most cases in Philadelphia. The extreme depression of the system in the yellow fever in warm weather and in hot climates, renders the restoration of it to a healthy state of action more gradual, and of course more safe, by means of purging, than bleeding. The latter remedy does harm, only by restoring the blood-vessels too suddenly to preternatural action, without reducing them afterwards. Had bleeding been practised agreeably to the method

thod described by Riverius, (mentioned in a former publication *), or had the fever in Jamaica run on to more than four or five paroxysms, I am sure the loss of blood would have been not only safe, but generally beneficial. I have, in another place, † given my reasons why *moderate* bleeding in this, as well as many other diseases, does harm. In those cases where it has occurred in large quantities from natural hæmorrhages, it has always done service in the West Indies. The ineffectual, and in some cases, the evils, of *moderate* blood-letting are not confined to the yellow fever. It is equally ineffectual, and in some instances equally hurtful, in apoplexy, internal dropsy of the brain, pleurisy, and pulmonary consumption. Where all the different states of the pulse which indicate the loss of blood are perfectly understood, and blood-letting conformed in *time* and in *quantity* to them, it never can do harm in any disease. It is only when it is prescribed empirically, without the direction of just principles, that it has ever proved hurtful. Thus the fertilizing vapors of heaven, when they fall only in dew, or in profuse showers of rain, are either insufficient to promote vegetation, or altogether destructive to it.

There may be habits in which great and long protracted debility, whether direct or indirect, may

* Account of the Yellow Fever in 1793. † Ibidem.

have so far exhausted the active powers of the system, as to render bleeding altogether improper in this disease, in a West India climate. Such habits are sometimes produced in soldiers and sailors by the hardships of a military and naval life. Bleeding in such cases, Dr. Davidson assures me in a letter dated from Martinique, February 29th, 1796, did no good. The cure was effected under these circumstances by purges, and large doses of calomel. But where this chronic debility does not occur, bleeding, when properly used, can never be injurious, even in a tropical climate, in the yellow fever. Of this there are many proofs in the writings of the most respectable English and French physicians. In spite of the fears and clamors which have been lately excited against it in Jamaica, my late friend and cotemporary at the college of Edinburgh, Dr. Broadbelt, in a letter from Spanish Town, dated January 6th, 1795, and my former pupil Dr. Weston, in a letter from St. Ann's Bay, dated June 17th, 1795, both assure me that they have used it in this fever with great success. Dr. Weston says that he bled "*copiously* three times in 24 hours, and thereby saved his patient."

Dr. Chisholm has lately endeavoured to rest the care of malignant fevers wholly upon the evacuation obtained from the salivary glands, by means of

mercury. I have no doubt of the efficacy of the Doctor's practice, but from his own account it was much less successful than the practice in the United States has been, from the combined operation of bleeding, purging, and a salivation. From the description which the Doctor has given of the state of the pulse, of the frequent hæmorrhages which occurred in the Boullam fever, and of the state of the brain after death, I am satisfied that bleeding and purging would have rendered his practice much more successful. Notwithstanding the Boullam fever was highly inflammatory, it was materially different from the yellow fever of the West Indies and of the American States. This appears 1. From its origin, it having been produced by human miasma in an African vessel which arrived at Grenada, and not by marsh exhalation. 2. From its being contagious in the West Indies, which Dr. Chisholm says is never the case with the yellow fever *. 3. From its infecting at the distance of but 6, 8, or 10 feet; whereas the yellow fever infects at the distance of 20 and 30 feet. 4. From the yellow fever, and a fever composed of the combined contagions of the Boullam and yellow fevers, prevailing at the same time in Grenada.

* P. 147.

I say nothing of the difference of the symptoms in the two fevers, for this depends upon circumstances purely accidental. In both, the contagion acts like other violent and general stimuli, which all produce nearly the same effects upon the system.

From Dr. Chisholm being unacquainted at the time he composed his book, with the history of the yellow fever of Philadelphia in the year 1793, he has asserted that it was the same disease that prevailed at Grenada, and that it had been conveyed from that island to Philadelphia. The assertion furnished a short lived triumph to some of the physicians of Philadelphia; but the facts which I have mentioned from the Doctor's book, soon shewed it to be without the least foundation.

The superior advantages of the North American mode of treating the yellow fever by means of *all* the common antiphlogistic remedies, will appear from comparing its success, with that of the West India physicians, under all the modes of practice which have been adopted in the islands. Dr. Desportes lost one half of all the patients he attended in the yellow fever in one season in St. Domingo.* His remedies were *moderate* bleeding, and purging, and the copious use of diluting drinks. Dr Bisset

* Vol. I. p. 55.

says, “ the yellow fever is often under particular circumstances very fatal, carrying off four or five in seven whom it attacks, and sometimes, but seldom, it is so favourable, as to carry off only one patient in five or six.” * The Doctor does not describe the practice under which this mortality takes place.

Dr. Home, I have elsewhere remarked,† lost “one out of four of his patients in Jamaica. His remedies were *moderate* bleeding, and purging, and afterwards bark, wine, and external applications of blankets dipped in hot vinegar.

Dr. Blane pronounces the yellow fever to be “ one of the most fatal diseases to which the human body is subject, and in which human art is the most unavailing.” His remedies were bleeding, bark, blisters, acid drinks, saline draughts, and camomile tea.

Dr. Chisholm acknowledges that he lost one in twelve of all the patients he attended in the jail fever. His principal remedy was a salivation. I shall hereafter shew the inferiority of this single mode of depleting, to a combination of it with bleeding and purging. In Philadelphia, and Baltimore where bleeding, purging, and salivation were used

* Medical Essays and Observations, p. 29.

† Account of the yellow fever in 1793.

in due time, and after the manner that has been described, not more than one in fifty died of the yellow fever. It is probable that greater certainty and success in the treatment of this disease, will not easily be attained, for idiosyncracy, and habits of intemperance which resist or divert the operation of the most proper remedies, a dread of the lancet, or the delay of an hour in the use of it, the partial application of that or any other remedy, the unexpected recurrence of a paroxysm of fever in the middle of the night, or the clandestine exhibition of wine or laudanum by friends, or neighbours, often defeat the best concerted plans of cure by a physician. Heaven in this, as in other instances, kindly limits human power, and benevolence, that in all situations man may remember his dependence upon the power and goodness of his Creator.*

* An innate dread of the lancet, deprived the world prematurely, of the talents and virtues of William Bradford Esq. Attorney General of the United States, on the 23d of August 1795. He refused to submit to bleeding in a malignant bilious fever for five days, during which time such effusions took place, as rendered that, and other remedies ineffectual in his case. I shall long, very long, mourn the death of this excellent man. He was to me a friend and a brother. The delay of bleeding for one night only, during a severe paroxysm of the same state of fever, deprived me of a beloved pupil Mr. Gilbert Watson on the 25th of September of the same year. He caught it by the most extraordinary exertions

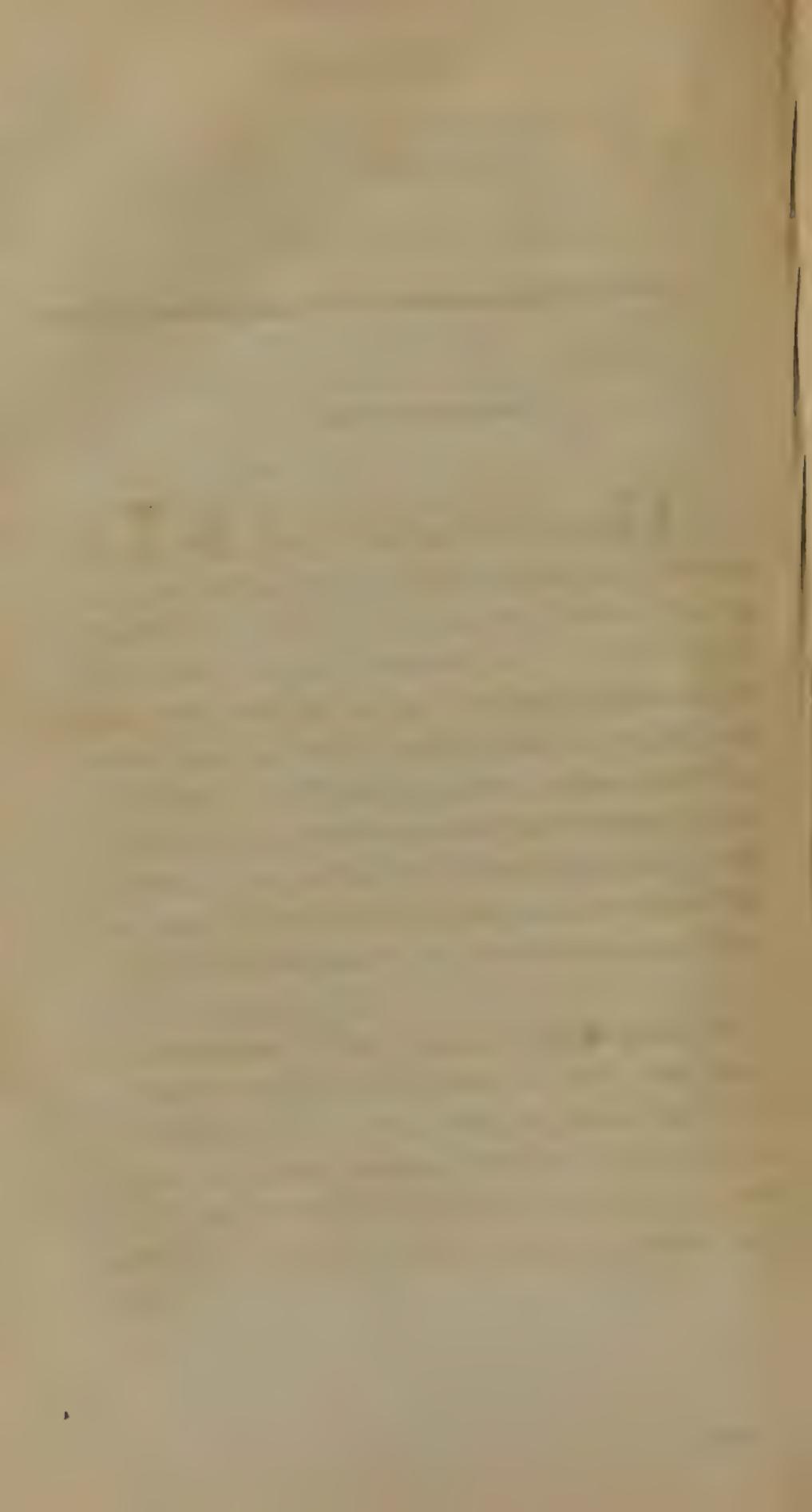
This victory incomplete as it is, over a disease, once the terror and scourge of mankind, has not been a cheap one. It has been purchased at the expense of much labour and obloquy. The number of the persons who have died under my care, has been much exaggerated, and the most affecting stories have been circulated of their dying under the immediate use of my remedies. A single death where bleeding had been used without success, has injured my reputation more than twenty deaths created by the neglect of it, or by the improper use of tonic remedies, have injured other physicians. Nay, further, the paleness which is induced by bleeding, has in a single instance, been urged with more success to discredit my practice, than a dozen deaths would have been, had I confined myself to the usual remedies for fever. The reader will conceive of the horror with which my practice of bleeding in this fever is viewed, when I add, that a lady who visited one of my female patients whom I had bled several times, implored her upon her knees not to permit me to bleed her any more. Her prayer had no effect. I bled her frequently afterwards, but that she might not be disturbed by a repetition of the entreaties of her friend, I concealed exertions of skill and humanity in attending and nursing a sick family, on the Delaware, about 20 miles from Philadelphia.

the blood, at her request, each time after drawing it in a closet, nor was it known that I did so, until some time after her recovery.

I commit the calumnies which have followed my opinions and practice in this fever, to the dust. If the soil, I have endeavoured to cultivate, should afford a plentiful harvest to my pupils, I shall not repine, although I have reaped nothing from it, but briars and thorns. And if my labours upon this subject should be blessed to the conviction and benefit of the citizens of Philadelphia, I shall rejoice in my persecutions.

To that BEING who often makes use of weak and unworthy instruments to accomplish the purposes of his benevolence, in order thereby to fix the gratitude of his creatures upon his own almighty power and goodness, I desire thus publicly to record my acknowledgments for having made me in the smallest degree useful to my fellow men in any part of the world, by the revival and application of remedies which have subdued, in a great measure, the force of a once formidable and mortal disorder. To his great and holy name be ascribed honor, and power, and glory, by all his intelligent creatures, for ever, and ever.

AN
INQUIRY
INTO THE
PROXIMATE CAUSE
OF
FEVER.



A N

INQUIRY, &c.

HAVING yielded to the solicitations of my pupils to publish a defence of blood-letting in certain diseases, I found that I could not do justice to the subject, as it relates to the cure of fevers, without first delivering a few observations upon that state of the blood-vessels, which constitutes the proximate cause of fever. I shall therefore proceed briefly to deliver the substance of what I have taught for several years upon this subject in the University of Pennsylvania, and what has, for many years, regulated my practice in the treatment of fevers.

Previously to my entering upon this subject, I shall give a short account of the changes which I have made in my opinions upon it. My first principles in medicine were derived from Dr. Boerhaave, and from his aphorisms as explained by Vanswieten, I adopted my first ideas of fever.

The

The reader may easily conceive of the pains I took to become master of this subject, when I add, that before I was twenty years of age, I abridged all those volumes of Vanswieten's Commentaries on Dr. Boerhaave's aphorisms which treat of fever. I need hardly add, that Dr. Boerhaave placed its proximate cause wholly in a lentor of the blood, and in morbid matter.

When I went to Edinburgh in the year 1766, I relinquished this theory of fever, and embraced a more rational one, first proposed by Dr. Hoffman; and afterwards revived with many advantages by Dr. Cullen, I mean the theory of a spasm upon the extremities of the capillary vessels in every part of the surface of the body. Soon after my settlement in Philadelphia in the year 1769 I found that this theory did not accord with many of the phenomena of fever. I was therefore forced to desert it; and for many years I floundered upon an ocean of doubt and uncertainty with respect to the proximate cause of fever. Many painful hours have I spent in contemplating this subject. At length light broke in upon my mind. The phenomena of fever suddenly appeared to me in a new order. I instantly combined them into a new theory. Whether this theory be just, or not, time must discover. Since I have adopted it, my practice in fevers has been more simple,

ple, and far more successful than formerly. It has moreover thrown a light upon the proximate cause of several other diseases, and led to a practice equally simple and successful in them. I feel no shame in thus publicly acknowledging that I have more than once changed my opinions in medicine. To be unchangeable, belongs only to that being who sees things in their order and relation to each other by a single act of intuition. A change in opinions is the necessary effect of succession in the acquisition of knowledge, and I believe a new truth is seldom acquired by men of common education, but at the expence of an old error.

I shall not attempt to give a definition of fever. It appears in so many different forms, that a just view of it can only be given in a minute detail of all its symptoms and states.

In order to render the theory of fever, which I am about to deliver, more simple and intelligible, it will be necessary to premise a few general propositions.

I. Fevers of all kinds are preceded by general debility. This debility is of two kinds, viz. direct and indirect. The former depends upon an abstraction of usual and natural stimuli; the latter upon

upon an increase of natural, or upon the action of preternatural stimuli upon the body. However opposite these causes of debility may be, they unite in their effects, and that in such a manner, that direct and indirect debility are frequently to be distinguished, only by a knowledge of the causes which induce them.

That fevers are preceded by general debility, I infer from their causes. These act directly or indirectly on the system. I shall first mention those causes of fever which act by inducing *direct*, and afterwards those which act by inducing *indirect* debility.

The former are,

1. Cold. This is universally acknowledged to be a predisposing cause of fever. That it debilitates, I infer, 1. From the languor which is observed in the inhabitants of cold countries ; and from the weakness which is felt in labour or exercise in cold weather.
2. From the effects of experiments, which prove, that cold air and cold water lessen the force and frequency of the pulse.

The other causes of direct debility which predispose to fever are,

2. The

2. The debilitating passions of fear, grief, and despair.

3. All excessive evacuations, whether by the bowels, blood-vessels, pores, or urinary passages.

4. Famine, or the abstraction of the usual quantity of nourishing food.

The causes which predispose to fever by inducing *indirect* debility are,

1. Heat. Hence the greater frequency of fevers in warm climates and in warm weather.

2. Intemperance in eating and drinking.

3. Fatigue.

4. Certain causes which act by over-stretching a part or the whole of the body, such as lifting heavy weights, external violence acting mechanically in wounding, bruising, or compressing particular parts, extraneous substances acting by their bulk or gravity, burning, and the like. * Some of these causes act locally, but they affect the system secondarily by

* Cullen's First Lines.

inducing

inducing in it indirect debility. I infer further, that fevers depend upon predisposing debility from the *time* in which they most commonly attack, viz. in the night, when the system is in a state of debility; and from the symptoms which accompany the attack of a fever, such as weakness in the limbs, inability to stand or walk, coldness or chills, sleepiness, a shrinking of the hands and face, and a weak or quick pulse.

In answer to this general proposition it may be said, that contagions, whether of the small-pox or measles, act without the predisposition of debility; and that this predisposition is not necessary to produce a fever from the contagions of the plague or yellow fever. To this I reply, that none of those contagions act so as to produce fever, until they have first induced indirect debility; and that their action is more speedy, certain, and violent in proportion to the degrees of direct or indirect debility which have preceded them. This is so well known, that the safety or fatal issue of fevers from contagion is generally expected, from their having been preceded by more or less of the enumerated causes of direct or indirect debility.

II. Debility is always succeeded by increased excitability, or a greater aptitude to be acted upon by

by stimuli. This increase of excitability is said by Dr. Brown to be confined only to a state of direct debility, but it takes place in all cases of indirect debility ; where it is *suddenly* induced upon the system. Indirect and direct debility are upon a footing, where they are of a chronic nature. They both equally expend the excitability of the system, and leave it in a state in which stimuli generally act with too little force upon it to excite in it the commotions of fever.

III. The diminution or abstraction of one stimulus is always followed by the increased action of others.

Let us apply these principles, before we lose sight of them, to the production of fever.

Has the body been debilitated by long exposure to the cold air?—its excitability is thereby increased, and heat acts upon it with an accumulated force ; hence the frequency of catarrhs, pleurisies, and other inflammatory fevers in the spring, after a cold winter ; and of bilious remittents in the autumn, when warm days succeed to cold and damp nights. These diseases are seldom felt for the first time in the open air, but generally after the body has been exposed to cold, and afterwards to the heat of a warm room or a warm bed. Mild intermit-

tents

tents have frequently been observed to acquire an inflammatory type in the Pennsylvania hospital, in the months of November and December, from the heat of the stove rooms acting upon bodies previously debilitated by cold and disease.

Has there been an abstraction of heat by a sudden shifting of the wind from the south-west to the north-west or north-east points of the compass, or by a cold night succeeding to a warm day?—a fever is thereby frequently excited. These sources of fever occur every autumn in Philadelphia. The miasma or contagion which exist in the body at that time in a harmless state, are excited into action by the debility from cold, aided in the latter case by the inaction of sleep suddenly induced upon the system.

Again: Has the body been suddenly debilitated by fatigue?—its excitement is thereby diminished, but its excitability is increased in such a manner that the stimulus of a full meal, or an intemperate glass of wine, if taken immediately after the fatigue is induced upon the body, excites a fever; hence the frequency of fevers in persons upon their return from hunting, surveying, long rides, or from a camp life. A fever from the last cause, was very common during the late war in America. A hot supper, and afterwards the heat of a warm bed, sometimes

times induced not only fever, but a convulsion in the nervous system in many persons the night after they returned from the coarse diet of the camp, and from sleeping upon an earthen or wooden floor. Many other instances might be mentioned of fever being brought on by ordinary stimuli, acting upon increased or accumulated excitability.

This connection of excitability with debility, has lately been pointed out by the French physicians by the terms "laxité vibratile," by which they mean a liableness in the system to be thrown into vibrations or motions by the predisposition of debility.

That this vibratility, or disposition to preternatural motion in animal matter, is the predisposing cause of fevers, is evident from their occurring in those stages of life in which it is most common, as in infancy, childhood, youth, and middle life. Fevers are less common in old age, for the vibratility of the sanguiferous system, in which I shall presently say the proximate cause of *ordinary* fever is seated, generally declines in old people. It even lessens in the skin, as appears by contracting it for half a minute between the fingers.

IV. The stimuli which are the remote or exciting causes of fever, act in a manner wholly different

from what they do, upon a body in which there is no predisposition to fever. In health there is a constant and just proportion between the degrees of excitement and excitability, and the force of stimuli. But this is not the case in a predisposition to a fever. The ratio between the action of stimuli and excitement, and excitability is destroyed ; and hence the former act upon the latter with a force which produces irregular action, or a convulsion in the arterial system. When the body is debilitated, and its excitability increased, either by fear, darkness, or silence, a sudden noise occasions a short convolution. We awake in like manner in a light convolution, from the sudden opening of a door, or from the sprinkling of a few drops of water in the face, after the excitability of the system has been accumulated by a night's sleep. In a word, it seems to be a law of the system that stimulus, in an over-proportion to excitability, either produces convolution, or goes so far beyond it, as to destroy motion altogether in death.

V. The stimuli which induce the irregular action or convolution of fever, act, for the most part, primarily upon the sanguiferous, and particularly upon the arterial system. The arteries pervade every part of the body. They terminate on every part of its surface, in which I include the lungs and alimentary

mentary canal, as well as the skin. It is from this circumstance that they are so easily affected by cold, heat, and all the other remote and exciting causes of fever. I need not pause to prove that the blood-vessels possess muscular fibres, and that their irritability, or disposition to motion, depends upon them. This has been demonstrated by Dr. Vasschuer and Mr. John Hunter by many experiments. Dr. Boerhaave admits it in the history he has given in his Institutes, of an ox that was killed immediately after it had been violently heated by running away. The coats of its arteries were suffused with blood, in consequence of inflammation. Even Dr. Haller, who denies the muscularity and irritability of the blood-vessels, implies an assent to them in the following words: "There are nerves which descend for a long way together through the surface of the artery, and at last vanish in the cellular substance of the vessel, of which we have a specimen in the external and internal carotids, and in the arch of the aorta; and from these do not the arteries seem to derive a muscular and convulsive force very different from that of their simple elasticity? Does not this shew itself plainly in *fevers*, faintings, palsies, consumption, and passions of the mind?" *

* First Lines, § 32. of the chapter on the Arteries.

The morbid action of the blood-vessels discovers itself in preternatural force or frequency in the pulsations of the arteries. In this state of the arteries, the stomach, bowels, and muscles exhibit marks of preternatural weakness, for natural excitement is abstracted from them, and concentrated in the sanguiferous system.

VI. There is but one remote cause of fever, and that is stimulus. Heat, alternating with cold, * marsh and human miasmata, contagions and poisons of all kinds, intemperance, passions of the mind, bruises, burns, and the like, all act by a stimulating power only, in producing fever. This proposition is of great application, inasmuch as it cuts the sinews of the division of diseases from their remote causes. Thus it establishes the sameness of a pleurisy, whether it be excited by heat succeeding cold, or by the contagion of the small-pox, measles, or yellow fever.

VII. There is but one fever. However different the predisposing, remote, or exciting causes of fever

* Dr. Sydenham ascribes nearly all fevers to this cause, particularly to leaving off winter clothes too soon, and to exposing the body to cold after it has been heated. These two sources of fever, he adds, destroy more than the plague, sword, or famine.

may be, whether direct or indirect debility, whether heat or cold succeeding to each other, whether marsh or human miasmata, whether intemperance, a fright, or a fall, still I repeat, there can be but one fever. I found this proposition upon all the supposed variety of fevers having but one proximate cause. Thus fire is an unit, whether it be produced by friction, percussion, electricity, fermentation, or by a piece of wood or coal in a state of inflammation.

VIII. All ordinary fever being seated in the blood-vessels, it follows of course, that all those local affections we call pleurisy, angina, phrenitis, internal dropsy of the brain, pulmonary consumption, and inflammation of the liver, stomach, bowels, and limbs, are symptoms only of an original and primary disease in the sanguiferous system. The truth of this proposition is obvious, from the above local affections succeeding primary fever, and from their alternating so frequently with each other. I except from this remark those cases of primary affections of the viscera which are produced by local injuries, and which, after a while, bring the whole sanguiferous system into sympathy. These cases are uncommon, amounting probably to not more than one in a hundred of all the cases of local affection which occur in general fever.

Having premised these general propositions, I go on to remark, that a fever (when not misplaced) consists in a morbid excitement and irregular action in the blood-vessels, more especially in the arteries. This morbid excitement, or irregular action, manifests itself to the fingers, when pressed upon the radial artery, by preternatural fulness, force, and frequency, or by preternatural slowness, intermissions and depression in what are called inflammatory fevers, and by preternatural frequency without fulness or force, in what are called typhus fevers.

I have called the action of the arteries *irregular* in fever, to distinguish it from that excess of action which takes place after violent exercise, and from that quickness which accompanies fear or any other directly debilitating cause. The action of the arteries here is *regular*, and when felt in the pulse, affords a very different perception to the mind from that which we feel in the pulse of a patient labouring under a fever.

This irregular action is in other words, a **CONVULSION** in the sanguiferous, but more obviously, in the arterial system.

That this is the case I infer from the strict analogy between symptoms of fever, and convulsions in the nervous

nervous system. I shall briefly mention the particulars in which this analogy takes place.

1. Are convulsions in the nervous system preceded by debility? So is the convulsion of the blood-vessels in fever.

2. Does debility induced on the whole, or on a part only, of the nervous system, predispose to general convulsions, as in tetanus? So we observe debility, whether it be induced on the whole or on a part of the arterial system, predisposes to general fever. This is obvious in the fever which ensues alike from cold applied to every part of the body, or from a stream of cold air falling upon the neck, or from the wetting of the feet.

3. Do tremors precede convulsions in the nervous system? So they do the convulsion of the blood-vessels in fever.

4. Is a coldness in the extremities a precursor of convulsions in the nervous system? So it is of fever.

5. Do convulsions in the nervous system impart a jerking sensation to the fingers? So does the con-

vulsion of fever in the arteries, when felt at the wrists.

6. Are convulsions in the nervous system attended with alternate action and remission? So is the convolution of fever.

7. Do convulsions in the nervous system return at regular and irregular periods? So does fever.

8. Do convulsions in the nervous system, under certain circumstances, affect the functions of the brain? So do certain states of fever.

9. Are there certain convulsions in the nervous system which affect the limbs, without affecting the functions of the brain, such as tetanus, and chorea sancti Viti? So there are certain fevers, particularly the common hectic, which seldom produces delirium or even head ach, and frequently does not confine a patient to his bed.

10. Are there local convulsions in the nervous system, as in the hands, feet, neck, and eye-lids? So there are local fevers. Intermittents often appear in the autumn with periodical heat and pains in the eyes, ears, jaws, and back.

11. Are

11. Are there certain grades in the convulsions of the nervous system, as appears in the hydrophobia, tetanus, epilepsy, hysteria and, hypochondriasis? So there are grades in fevers, as in the plague, yellow fever, small-pox, rheumatism, and common remitting and intermitting fevers.

12. Are nervous convulsions most apt to occur in infancy? So are fevers.

13. Are persons once affected with nervous convulsions, frequently subject to them through life? So are persons once affected with fever. The intermitting fever often returns with successive springs or autumns, and in spite of the bark, sometimes continues for many years in all climates and seasons.

14. Is the strength of the nervous system increased by convulsions? This is so evident, that it often requires four or five persons to confine a delicate woman to her bed in a convulsive fit. In like manner the strength of the arterial system is increased in a fever. This strength is great in proportion to the weakness of every other part of the body.

15. Do we observe certain nervous convulsions to affect some parts of the nervous system more than others, or in other words, do we observe preternatural

ternatural strength or excitement, to exist in one part of the nervous system, while other parts of the same system exhibit marks of preternatural weakness, or defect of excitement? We observe the same thing in the blood-vessels in a fever. The pulse at the wrist is often *tense*, while the force of the heart is very much diminished. A delirium often occurs in a fever from excess of excitement in the blood-vessels of the brain, while the pulse at the wrist exhibits every mark of preternatural weakness.

16. Is there a rigidity of the muscles in certain nervous diseases, as in *catalepsy*? Something like this solstice in convulsion occurs in that state of fever in which the pulse beats but 60, or fewer strokes in a minute.

17. Do convulsions go off *gradually* from the nervous system, as in *tetanus*, and *chorea sancti Viti*? So they do from the arterial blood-vessels in certain states of fever.

18. Do convulsions go off *suddenly* in any cases from the nervous system? The convulsion in the blood-vessels, goes off in the same manner by a sweat, or by an *hæmorrhage*, frequently in the course of a night, and sometimes in a single hour.

19. Does

19. Does palsey in some instances succeed to convulsions in the nervous system? Something like a palsey occurs in the blood-vessels in fevers of great inflammatory action. I shall hereafter ascribe the dissolved appearance of the blood in malignant fevers to this tendency of the blood-vessels to a paralytic state. It begins in the veins in which muscular action is more feeble than in the arteries. This has been proved by Dr. Mitchell in his account of the yellow fever in Virginia in the year 1741. He found the blood to be dissolved when drawn from the veins, which when drawn from the arteries of the same persons, exhibited no marks of dissolution. This fact is of great importance in medicine, as I hope to shew when I come to treat of blood-letting.

From the facts and analogies which have been mentioned, I have been led to believe that irregular action or a convulsion in the blood-vessels, is the proximate cause of fever.

There is a wonderful frugality in the operations of nature. Two instruments are never employed by her to accomplish that which can be effected by one. As the predisposing and remote causes of all general diseases are simple, so is the proximate. My theory of fever then resolves itself into a chain, consisting of four links. 1. Predisposing debility, or weakened

weakened excitement of the blood-vessels. 2. An increase of their excitability. 3. Stimulating powers applied to them. And, 4. Irregular action or convolution.

I might digress here, and shew that all diseases, whether they be seated in the arteries, muscles, nerves, brain, or alimentary canal, are all preceded by debility; and that their essence consists in irregular action, or in the absence of the natural order of motion, produced or invited by predisposing debility. Hence they have very properly been called **DISORDERS**. I might further shew, that all the moral as well as physical evil of the world consists in predisposing weakness, and in subsequent derangement of action or motion; but these collateral subjects are foreign to our present inquiry.

Let us now proceed to examine how far the theory, which has been delivered, accords with the phenomena of fever.

I shall divide these phenomena into two kinds.

I. Such as are transient, and more or less common to all fevers. These I shall call *symptoms* of fever.

II. Such

II. Such as, being more permanent and fixed, have given rise to certain specific names. These I shall call *states* of fever.

I shall endeavour to explain and describe each of them in the order in which they have been mentioned.

I. Lassitude is the natural effect of the predisposing debility which precedes fever.

Coldness and chills are the effects of the abstraction of excitement, or natural motion from the surface of the body. The absence of chills indicates the sensibility of the external parts of the body to be suspended or destroyed, as well as their irritability; hence where death occurs in the fit of an intermittent, there is no chill. A chilly fit, for the same reason, seldom occurs in the most malignant cases of fever. It has been remarked, that the chilly fit, in common fevers, seldom appears in its full force until the patient approaches a fire, or lies down in a warm bed; for in these situations the sensibility of the system is restored by the stimulus of the heat acting upon the extremities of the blood-vessels. It is produced in a mechanical manner, and is by no means the effect of an effort of the healing powers of nature to save the system from destruction.

Tremors

Tremors are the natural consequence of the abstraction of that support which the muscles receive from the fulness and tension of the blood-vessels. It is from this retreat of the blood towards the viscera, that the capillary arteries lose their fulness and tension; hence they contract like other soft tubes that are emptied of their contents. This contraction has been called a spasm, and has improperly been supposed to be the proximate cause of fever. From the explanation that has been given of its cause, it appears like the coldness and chills, to be nothing but an accidental concomitant or effect of a paroxysm of fever.

The local pains in the head, breast, and bones in fever, appear to be the effects of the irregular determination of the blood to those parts, and to morbid action being thereby induced in them.

The vomiting and diarrhoea are produced by morbid excitement in the vessels of the stomach and bowels.

The want of appetite and costiveness are the consequences of a defect of excitement or natural action in the same parts of the body.

The

The dry skin or partial sweats appear to depend upon diminished or partial action in the vessels which terminate on the surface of the body.

The high coloured and pale urine, are occasioned by an excess or a deficiency of excitement in the secretory vessels of the kidneys.

The suppression of the urine seems to arise from what Dr. Clark calls an engorgement, or choaking of the vessels of the kidneys. It occurs most frequently in malignant fevers.

Thirst is probably the effect of a preternatural excitement of the vessels of the fauces. It is by no means an uniform symptom of fever. We sometimes observe it in the highest degree, in the last stage of diseases, induced by the retreat of the last remains of excitement from every part of the body, to the throat.

The white tongue is produced by a change in the secretion which takes place in that organ. Its yellow colour is the effect of bile; its dryness, is occasioned by an obstruction of secretion; and its dark and black colour, by a tendency to mortification.

It will be difficult to account for the variety in the degrees and locality of *heat* in the body in a fever, until we know more of the cause of animal heat. From whatever cause it be derived, its excess and deficiency, as well as all its intermediate degrees, are intimately connected with more or less excitement in the arterial system. It is not necessary that this excitement should exist only in the large blood-vessels. It will be sufficient for the purpose of creating great heat, if it occur only in the cutaneous vessels; hence we find a hot skin in some cases of malignant fever in which there is an absence of pulse. A defect of excitement produced by great excess of stimulus, as in the first stage of violent malignant fevers, is often accompanied by a deficiency of heat, and in some instances by a coldness on the surface of the body. In these cases there is a defect of excitement in the vessels of the skin as well as in the larger blood-vessels. Local heat, whether in the head, breast, hands, or feet, I suppose to be the effect of local excitement.

Eruptions seem to depend upon effusions of serum, lymph, or red blood upon the skin, with or without inflammation, in the cutaneous vessels.

I decline taking notice in this place of the sameness of the symptoms which are produced by indirect

direct and direct debility in the system. They appear not only in the temperature of the body, but in all the different symptoms of fever. It is of importance to know when they originate from the former, and when from the latter states of debility, as they require very different and opposite remedies to remove them.

It remains only to explain the cause, why excess in the force or frequency of the action of the blood-vessels should succeed debility in a part, or in the whole of the body, and be connected for days and weeks with preternatural debility in the muscles, nerves, brain, and alimentary canal. I shall attempt the explanation of this phenomenon by directing the attention of the reader to the operations of nature in other parts of her works.

1. A calm may be considered as a state of debility in the atmosphere. It predisposes to a current of air. But is this current proportioned to the loss of the equilibrium of the air? By no means: It is excessive in its force, and tends thereby to destroy the works both of nature and art.

2. The passions are given to man on purpose to aid the slow and uncertain operations of reason. But is their action always proportioned to the causes which excite them? An acute pneumony brought

on by the trifling injury done to the system by the fatigue and heat of an evening spent in a dancing assembly, is but a faint representation of the immense disproportion between a trifling affront, and that excess of passion which seeks for gratification in poison, assassination, or a duel. The same disproportion appears between cause and effect in public bodies. A hasty word of no mischievous influence, has often produced convulsions, and even revolutions, in states and empires.

If we return to the human body, we shall find in it many other instances of the disproportion between stimulus and action, besides that which takes place in the exciting and proximate cause of fever.

3. A single castor oil nut, although rejected by the stomach upon its first effort in vomiting, has, in one instance that came within my knowledge, produced a vomiting that continued nearly twenty-four hours. Here the duration of action was far beyond all kind of proportion to the cause which excited it.

4. A grain of sand, after being washed from the eye, is often followed by such an inflammation, or excess in the action of the vessels of the eye, as to require bleeding, purging, and blistering to remove it.

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Could we comprehend every part of the sublime and ineffable system of the natural, moral, and political government of the world, I am sure we should discover nothing in it, but what tended ultimately to order and happiness. But there is evil in the world, and the operations of nature, which were originally the ministers of goodness only to man, are in many instances the vehicles of this evil. In religion and morals, as well as in medicine, nature leads to error and destruction. When we worship the sun, a cat, a crocodile, or the devil, we follow nature. When we lie, steal, and commit murder and adultery, we follow nature. In like manner, when we indulge every appetite and passion of our patients in sickness, and create haemorrhages, obstructions, dropsies, palsies, apoplexies, and death, by neglecting bleeding and purging in fevers, we follow nature. But while I maintain this unusual language in medicine, let it be remembered, that the operations of nature were not originally the means of seducing or injuring man ; and Revelation assures us, that a time will come, when the dominion of order shall be restored over every action of his body and mind, and health and happiness again be the result of every movement of nature.

From the view I have given of the state of the blood-vessels in fever, the reader will perceive the

difference between my opinions and Dr. Brown's upon this subject. The Doctor supposes a fever to consist in debility. I do not admit debility to be a disease, but place it wholly in morbid excitement, invited and fixed by previous debility. He makes a fever to consist in a change only of a natural action of the blood-vessels. I maintain that it consists in a preternatural and convulsive action of the blood-vessels. Lastly, Dr. Brown supposes excitement and excitability to be equal in fever. My theory supposes a fever to be the reverse of this. It consists in unequal or divided excitement and excitability. Health consists in the equality and uniformity of them both; and the business of medicine, as I shall say hereafter, is to equalize them in the cure of fever; that is, to abstract their excess from the blood-vessels, and to restore them to the other parts of the body.

It belongs to this part of our view of fever to repeat from Dr. Boerhaave, that its termination is always in health, in another disease, or in death. A slight fever only can terminate in health. All fevers of violent action, when left to themselves, or when partially cured, terminate in other diseases, or in death. The last is the effect of the single or combined operation of the following causes: 1. Effusions in parts essential to life. 2. Such a change being

being induced in the excretions, by the violent action of the vessels upon the blood, as to render them destructive to the organs of the body. 3. The inability of the system, from universal direct debility, to receive impressions, or to support the motions of life. Or lastly, death from fever is the effect of the combined operation of all the three causes that have been mentioned. I cannot dismiss the blood-vessels, as the seat of a general and frequent disease, without lamenting that their physiology and pathology have been so little studied by physicians. They are the first born parts of the human body ; they support, in a great measure, the sensibility and irritability of the nervous system ; they are the centinels of the whole system in sleep ; and, they are the last retreat of departing life.

II. I come now to apply the theory which I have delivered, to the explanation and description of the different phenomena or states of fever.

I have said that there is but one fever. Of course I do not admit of its artificial division into genera and species. A disease which so frequently changes its form and place, should never have been designated, like plants and animals, by unchangeable characters. The oak tree and the lion possess exactly the same properties which they did near 6000 years ago.

But who can say the same thing of any one disease? The pulmonary consumption is sometimes transformed into head ach, rheumatism, diarrhoea, and mania, in the course of two or three months, or the same number of weeks. The bilious fever often appears in the same person in the form of colic, dysentery, inflammation of the liver, lungs, and brain, in the course of five or six days. The hypochondriasis and the hysteria seldom fail to exchange their symptoms twice in the four-and-twenty hours. Again: The oak tree has not united with any of the trees of the forest, nor has the lion imparted his specific qualities to any other animal. But who can apply similar remarks to any one disease? Phrenitis, gastritis, enteritis, nephritis, and rheumatism, all appear at the same time in the gout and yellow fever. Many observations of the same kind might be made upon all other diseases. To describe them therefore by any fixed or specific characters, is as impracticable as to measure the dimensions of a cloud on a windy day, or to fix the component parts of water by weighing it in a hydrostatic balance. Much mischief has been done by nosological arrangements of diseases.

They erect imaginary boundaries between things which are of a homogeneous nature. They degrade the human understanding, by substituting simple perceptions, to its more dignified operations
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of judgment and reasoning. They gratify indolence in a physician, by fixing his attention upon the name of a disease, and thereby leading him to neglect the varying state of the system. They moreover lay a foundation for disputes among physicians, by diverting their attention from the simple predisposing and proximate, to the numerous, remote, and exciting causes of diseases, or to their more numerous and complicated effects. The whole *materia medica* is infected with the baneful consequences of the nomenclature of diseases; for every article in it is pointed only against their names, and hence the origin of the numerous contradictions among authors who describe the virtues and doses of the same medicines. By the rejection of the artificial arrangement of diseases, a revolution must follow in medicine. Observation and judgment will take the place of reading and memory, and prescriptions will be conformed to existing circumstances. The road to knowledge in medicine by this means will likewise be shortened; so that a young man will be able to qualify himself to practice physic at as much less expense of time and labour than formerly, as a child would learn to read and write by the help of the Roman alphabet, instead of Chinese characters.

In thus rejecting the nosologies of the schools, I do not wish to see them banished from the libra-

ries of physicians. When consulted as histories of the effects of diseases only, they may still be useful. I use the term diseases, in conformity to custom, for properly speaking, disease is as much a unit as fever. It consists simply of morbid action or excitement in some part of the body. Its different seats and degrees, should no more be multiplied into different diseases, than the numerous and different effects of heat, and light upon our globe should be multiplied into a plurality of suns.

The advocates for Dr. Cullen's system of medicine, will not, I hope, be offended by these observations. His immense stock of reputation, will enable him to sustain the loss of his nosology, without being impoverished by it. In my attempts to introduce a new arrangement of diseases, I shall only give a new direction to his efforts to improve the healing art.

I have considered morbid action in the blood-vessels, whether it consist in preternatural force and frequency, or preternatural force without frequency, or frequency without force, to constitute the proximate cause of fever. Excess in the force and frequency of the blood-vessels, has been considered as the characteristic mark of what is called inflammatory fever. But there are marks which indicate a much greater excess of stimulus upon the blood-vessels.

vessels. These are preternatural slowness, intermissions and depression in the pulse, such as occur in certain malignant fevers. In applying my theory of fever to the explanation of all its different states, I am led by this view of its inflammatory state, to consider them in the order of their inflammatory character, or according to the force of stimulus which acts upon the blood-vessels. The following appears to be the usual order of inflammatory diathesis, presented to us by nature, in the different fevers which are described by authors ;

1. The plague.
2. The yellow fever.
3. The natural small-pox.
4. The malignant sore throat.
5. The fever from the alternate action of cold and heat on the body, appearing with the symptoms of pleurisy, rheumatism, tonic gout, internal dropsy of the brain, and pulmonary consumption.
6. The measles.
7. Catarrh from cold, and influenza from contagion.
8. The common remitting fever, appearing occasionally with the symptoms of colic, dysentery, inflammation of the liver, and internal dropsy of the brain.
9. The scarlatina, puerperile and hectic fevers.
10. The

10. The jail fever.
11. The common mild intermittent.

This scale of the degrees of morbid action in fevers is taken from their usual symptoms. They vary with climate, season, and habit. There are intermittents, jail, and puerperile fevers, so inflammatory as to require frequent bleedings to cure them; and there are cases of plague, yellow fever, and pleurisy, which yield to a single dose of purging physic. It is upon the account of this want of uniformity in the character of fevers, and the influence of climate, season, and habit upon them, that I shall follow Dr. Clark, by substituting in the place of their usual names, certain definite states which may be applied, with varying circumstances, to them all.

1. I shall divide them into such as affect the whole arterial system, with no, or but little local affection.

2. Into such as affect the whole arterial system, and are accompanied at the same time with evident local affections. And,

3. Into such as appear to pass by the arterial system, and to fix themselves upon other parts of the

the body. These states of fever I shall call *misplaced*.

1. I shall begin under the first head, with the **MALIGNANT** state of fever. It constitutes the highest grade of inflammatory diathesis. It is known by attacking frequently without a chilly fit, by coma, a depressed, slow, or intermitting pulse, and sometimes by a natural temperature or coldness of the skin. It occurs in the plague, in the yellow fever, in the gout, and in the small-pox. Dr. Quier has described a pleurisy in Jamaica, in which some of those malignant symptoms took place. They are the effect of such a degree of stimulus as to prostrate the arterial system, and to produce a defect of action from an excess of force. Such is this excess of force in some instances in this state of fever, that it induces general convulsions, tetanus, and palsy, and sometimes extinguishes life in a few hours by means of apoplexy or syncope. The less violent degrees of stimulus in this state of fever produce palsy in the blood-vessels. It probably begins in the veins, and extends gradually to the arteries. It seems further to begin in the extremities of the arteries, and to extend by degrees to their origin in the heart. This is evident in the total absence of pulse which sometimes takes place in malignant fevers four-and-twenty, and even eight and forty hours before death.

death. But there are cases in which this palsey affects both the veins and arteries at the same time. It is probably from this simultaneous affection of the blood-vessels, that the arteries are found to be nearly full of blood after death from malignant fevers. The depressed, and intermitting pulse which occurs in the beginning of these fevers perhaps depends upon a tendency to palsey in the arteries independently of an affection of the heart or brain.

This *depressed* state of fever more frequently when left to itself terminates in petechiæ, buboes, carbuncles, abscesses and mortifications, according as serum, lymph, or red blood is effused in the viscera or external parts of the body. These morbid appearances have been ascribed to putrefaction, and the fever has received, from its supposed presence, the name of putrid. The existence of putrefaction in the blood in a fever is rendered improbable,

1. By Dr. Seybert's experiments * which prove that it does not take place in the blood in a living state. It occurs in the excretions of bile, fæces, and urine, but in this case it does not act as a ferment, but a stimulus only upon the living body.

* Inaugural dissertation entitled, "An Attempt to disprove the putrefaction of the blood in living animals."

2. By

2. By similar appearances, with those which have been ascribed to putrefaction, having been produced by lightning, by violent emotions of the mind, by extreme pain, and by every thing else which induces sudden and universal disorganisation in the fluids and solids of the body. To the facts mentioned in a former work,* with a view of refuting the opinion of putrefaction taking place in the blood, I shall add some others, which clearly prove that the symptoms which have been supposed to designate a putrid fever, are wholly the effect of mechanical action in the blood-vessels, and are unconnected with the introduction of a putrid ferment into the blood.

Hippocrates relates the case of a certain Antiphilus, in whom a putrid bilious fever (as he calls it) was brought on by the application of a caustic to a wound.†

An acute pain in the eye, Dr. Physick informed me, produced what are called the symptoms of a putrid fever, which terminated in death in five days, in St. George's hospital in the year 1793.

Dr. Desportes takes notice that a fish which he calls a sucker, affected the system nearly in the same

* Account of the yellow fever, in 1793.

† Epidemics, book iv.

manner

manner as the contagion of the yellow fever. A distressing vomiting, a coldness of the extremities, and an absence of pulse, were some of the symptoms produced by it, and an inflammation and mortification of the stomach and bowels, were discovered after death to be the effects of its violent operation.

Even opium in large doses, sometimes produces by its powerful stimulus the same symptoms which are produced by the stimulus of what are called putrid contagions. These symptoms are, a slow pulse, coma, a vomiting, cold sweats, a sallow colour of the face, and a suppression of the discharges by the urinary passages and bowels.

Error is often perpetuated by words. A belief in the putrefaction of the blood has done great mischief in medicine. The evil is kept up, under the influence of new theories, by the epithet putrid, which is still applied to fever in all our medical books. For which reason I shall reject it altogether hereafter, and substitute in its room

2. The GANGRENOUS state of fever, for what appear to some physicians to be signs of putrefaction, are nothing but the issue of a violent inflammation left in the hands of nature, or accelerated by stimulating medicines. Thus the sun, when viewed at mid-day

mid-day, appears to the naked eye, from the excess of its splendor, to be a mass of darkness, instead of an orb of light.

The same explanation of what are called putrid symptoms in fever, is very happily delivered by Mr. Hunter in the following words : “ It is to be observed (says this acute physiologist) that when the attack upon these organs, which are principally connected with life, proves fatal, that the effects of the inflammation upon the constitution, run through all the stages with more rapidity than when it happens in other parts ; so that at its very beginning, it has the same effect upon the constitution, which is only produced by the second stage of inflammation in other parts.” *

3. The SYNOCHA, or the common inflammatory state of fever, attacks suddenly with chills, and is succeeded by a quick, frequent, and tense pulse, great heat, thirst, and pains in the bones, joints, breast, or sides. These symptoms sometimes occur in the plague, the jail and yellow fever, and the small-pox ; but they are the more common characteristics of pleurisy, gout, and rheumatism. They now and then occur in the influenza, the measles, and the puerperile fever.

* Treatise on Inflammation, chap. I. 8.

4. The BILIOUS state of fever is produced by marsh miasmata or contagion, acting specifically upon the biliary ducts, or it may be induced by the usual remote causes of the gout. It is known by a full, quick, and tense pulse, or by a quick, full, and round pulse, without tension, and by a discharge of green, dark coloured, or black bile from the stomach and bowels.

Besides these occasional forms of bilious fever, it sometimes puts on the symptoms of a hectic. I have seen many instances of it in the autumn. The patient feels no pain in his head, has a tolerable appetite, and is able to sit up, and even to do business. My late invaluable friend Dr. Clarkson, died of this state of bilious fever.

5. The TYPHUS state of fever is generally preceded by all those circumstances which induce direct debility. It is known by a weak and frequent pulse, a disposition to sleep, a torpor of the alimentary canal, tremors of the hands, a dry tongue, and, in some instances, by a diarrhoea. These symptoms occur most frequently in the mild grades of the jail fever, and in the close of all the inflammatory states of fevers in which depleting remedies have not been used in their first stage. I heard of it in a few cases in the yellow fever of 1793,

and all writers take notice of cases of the plague, which run on into a slow fever that continues 30 and 40 days. I have seen it succeed the common bilious fever, pleurisy, and influenza. It has been confounded with the malignant state of fever, under the name of typhus gravior; but it differs widely from it in being accompanied by a feeble excitement in the blood-vessels, from a feeble stimulus, and by the usual signs of direct debility in every other part of the body.

From the accession of new stimuli, or an increase in the force of former ones, this typhus state of fever sometimes assumes, on the 11th, 14th, and even 20th days, the symptoms of the fynocha state of fever. It will be useful to remember this observation, not only because it establishes the unity of fever, but because it will justify the use of a remedy, seldom prescribed after the disease has acquired that name which associates it with stimulating medicines.

The common name of this state of fever is, the *nervous* fever. This name is improper; for it invades the nervous system by pain, delirium, and convulsions much less than several other states of fever. To prevent the absurd, and often fatal association of ideas upon the treatment of this state of

fever, I shall hereafter call it, from its duration, the *low chronic* state of fever. I have adopted the term *low*, from Dr. Butter's account of the remitting fever of children, in order to distinguish it from states of fever to be mentioned hereafter, in which the patient is not confined to his bed. This new name of the typhus or nervous fever, establishes its analogy with several other diseases. We have the acute and the chronic *rheumatism*; the acute and chronic *pneumony*, commonly called the *pleurisy* and *pulmonary consumption*; the acute and chronic inflammation of the brain, known unfortunately by the unrelated names of *phrenitis*, *madness*, and *internal dropsey* of the brain. Why should we hesitate, in like manner, in admitting acute and chronic fever in all those cases where no local inflammation attends.

6. The *typhoid* state of fever is composed of the *synocha* and *low chronic* states of fever. It is the *slow nervous fever* of Dr. Butter. The excitement of the blood-vessels is somewhat greater than in the *low chronic* state of fever. Perhaps the muscular fibres of the blood-vessels, in this state of fever, are affected by different degrees of stimulus and excitement. Supposing a pulse to consist of eight cords, I think I have frequently felt more or less of them tense or relaxed, according as the fever partook

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more or less of the synocha, or low chronic states of fever. This state of fever occurs most frequently in what are called the hectic and puerperal fevers, and in the scarlatina.

Both the low chronic, and the typhoid states of fever (the fever generated in jails, ships, and hospitals excepted) are most frequently artificial diseases. They are created by the negligence of patients, in not sending for early medical aid, or by the ignorance of physicians in not using sufficient evacuations.

7. There is a state of fever inclining more to the synocha than what is called the typhus, or low chronic state of fever. I have called it the *synochoid* state of fever.

8. There is a state of fever in which the pulse is small, but tense and quick. The patient, in this state of fever, is seldom confined to his bed. We observe it sometimes in the chronic rheumatism, and in pulmonary consumption. The inflammatory state of this grade of fever is proved from the inefficacy of the volatile tincture of guaiacum and other stimulants to remove it, and from its yielding so suddenly to blood-letting. I have called it the *synochula* state of fever.

9. The HECTIC state of fever differs from all the other states of fever, by the want of regularity in its paroxysms, in which chills, fever, and sweats are included ; and by the brain, nerves, muscles, and alimentary canal, being but little impaired in their functions by it. It appears to be an exclusive disease of the blood-vessels. It occurs in the pulmonary consumption, in some cases of lues, of scrophula, and of the gout, and after most of the states of fever which have been described. The force of the pulse is various, being occasionally synochoid, typhoid, and typhus.

10. There is a state of fever in which the morbid action of the blood-vessels is so feeble, as scarcely to be perceptible. Like the hectic state of fever, it seldom affects the brain, nerves, muscles, or alimentary canal. It is known in the southern states of America, by the name of INWARD fevers. The English physicians formerly described it by the name of febricula.

11. Intermissions, or the INTERMITTING and remitting states of fever, are common to all the states of fever which have been mentioned. But they occur most distinctly and universally in those which partake of the bilious diathesis. They have been ascribed to the reproduction of the stimulus of bile,

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to the recurrence of debility, and to the influence of the heavenly bodies upon the system. None of these hypotheses has explained the recurrence of fever, where the bile has not been in fault, where debility is uniform, and where the paroxysms of fever do not accord with the revolutions of any part of the solar system. I have endeavoured to account for the recurrence of the paroxysm of fever, in common with all other periodical diseases, by means of a natural or adventitious association of motions. Dr. Percival has glanced at this law of animal matter; and Dr. Darwin has explained by it, in the most ingenious manner, many natural and morbid actions in the human body.

12. The SWEATING state of fever occurs in the plague, in the yellow fever, in the small-pox, the pleurisy, the rheumatism, and in the hectic and intermitting states of fever. Profuse sweats appeared every other day in the autumnal fever of 1795 in Philadelphia, without any other symptom of an intermittent. The English sweating sickness was nothing but a symptom of the plague. The sweats in all these cases are the effects of morbid and excessive action, concentrated in the capillary vessels.

13. The FAINTING state of fever accompanies the plague, the yellow fever, the small-pox, and

some states of pleurisy. It is the effect of great indirect debility; hence it occurs most frequently in the beginning of those states of fever.

14. The BURNING state of fever has given rise to what has been called a species of fever. It is the causus of authors. Dr. Moseley, who rejects the epithet of yellow, when applied to the bilious fever, because it is only one of its accidental symptoms, very improperly distinguishes the same fever by another symptom, viz. the burning heat of the skin, and which is not more universal than the yellowness which attends it.

15. The COLD and CHILLY state of fever differs from a common chilly fit, by continuing four or five days, and to such a degree, that the patient frequently cannot bear his arms out of the bed. The coldness is most obstinate in the hands and feet. A COOLNESS only of the skin attends in some cases, which is frequently mistaken for an absence of fever.

Having mentioned those states of fever which affect the arterial system, without any, or with but little topical affection, I proceed next to enumerate those states of fever in which there are local affections combined more or less with general' feyer.

fever. They depend, 1. Upon local debility in the part affected. 2. Upon increased excitability in the part, in consequence of this debility. And, 3. Upon the morbid excitement induced in the part, by the stimulus of distention from the blood, and by the effusion of serum, lymph, or red globules in the weakened, and afterwards inflamed part. The reader will perceive here that I adopt the error loci of Dr. Boerhaave, as a link in the chain of causes which produce local inflammation. The states of fever which belong to this second head are as follow.

16. The **INTESTINAL** state of fever. I have been anticipated in giving this epithet to fever, by Dr. Balfour. * It includes the *colera morbus*, diarrhoea, dysentery, and colic. The remitting bilious fever appears, in all the above forms, in the summer months. They all belong to the *febris introversa* of Dr. Sydenham. The jail fever appears likewise frequently in the form of diarrhoea and dysentery. The dysentery is the offspring of miasmata and contagion, but it is often induced in a weak state of the bowels, by other exciting causes. The colic occasionally occurs with states of fever to be mentioned hereafter.

* Account of the Intestinal Remitting Fever of Bengal.

17. The PULMONARY state of fever includes the true and bastard pneumonia in their acute forms; also catarrh from cold and contagion, and the chronic form of pneumonia in what is called pulmonary consumption.

18. The ANGINOSA state of fever includes all those affections of the throat which are known by the names of cynanche, inflammatoria, tonsillaris, parotide, maligna, scarlatina, and trachealis. The cynanche trachealis is a febrile disease. The membrane which produces suffocation and death in the wind-pipe, is the effect of inflammation. It is probably formed, like other membranes which succeed inflammation, from the coagulable lymph of the blood.

19. The RHEUMATIC state of fever is confined chiefly to the labouring part of mankind. The topical affection is seated most commonly in the joints and muscles, which from being exercised more than other parts of the body, become more debilitated, and are, in consequence thereof, excited into morbid or inflammatory action.

20. The ARTHRITIC or GOUTY state of fever, differs from the rheumatic, in affecting, with the joints and muscles, all the nervous and lymphatic systems,

systems, the viscera, and the skin; also in having a specific remote cause, viz. intemperance. Its predisposing, exciting, and proximate causes are the same as the rheumatic and other states of fever. It bears the same ratio to rheumatism, which the yellow fever bears to the common bilious fever. It is a fever of more force than rheumatism.

21. The MANIACAL state of fever. I prove mania to be a fever, 1. From its causes, which are the same as those which induce all the other states of fever. 2. From its symptoms, particularly a full, tense, quick, and sometimes a slow pulse. 3. From the inflammatory appearances of the blood which has been drawn to relieve it. And, 4. From the phenomena exhibited by dissection in the brains of maniacs, being the same as are exhibited by other inflamed viscera after death. These are, effusions of water or blood, abscesses, and schirrus. The hardness in the brains of maniacs, taken notice of by several authors, is nothing but a schirrus (*fui generis*) induced by the neglect of sufficient evacuations in this state of fever. The reader will perceive by these observations, that I reject madness from its supposed primary seat in the mind or nerves. It is as much an original disease of the blood-vessels, as any other state of fever. It is to phrenitis, what pulmonary consumption

sumption is to pneumonia. The derangement in the operations of the mind is the effect only of a chronic inflammation of the brain, existing without an abstraction of muscular excitement.

22. The APOPLECTIC, 23. the PHRENITIC, 24. the PARALYTIC, 25. the LETHARGIC, and 26. the VERTIGINOUS states of fever, often accompany the malignant state of fever. They are commonly the effects of strong stimuli acting suddenly upon the brain in the beginning of fever; but they sometimes occur in the close of the common states of fever, more especially where blood-letting has not been used in a sufficient quantity.

27. The HYDROCEPHALIC state of fever occurs chiefly in children. The water which is found in the brain, is the effect of inflammation. To the proofs from dissections which I published formerly,* of the inflammatory nature of this state of fever, I shall add one more, communicated to me by my former pupil Dr. Coxe, in a letter from London, dated July 17th, 1795. "It so happened (says my ingenuous correspondent) that at the time of my receiving your letter, Dr. Clark was at the hospital. I read to him that part of it which relates to your success in the treatment of hydrocephalus internus.

* Medical Inquiries and Observations, Vol. II.

He was much pleased with it, and mentioned to me a fact, which strongly corroborates your idea of its being a primary inflammation of the brain. This fact was, that upon opening, not long since, the head of a child who had died of this disease, he found between three and four ounces of water in the ventricles of the brain; also an inflammatory crust on the optic nerves, as thick as he had ever observed it on the intestines in a state of inflammation. The child lost its sight before it died. The crust accounted, in a satisfactory manner, for its blindness. Perhaps something similar may be always noticed in the dissections of such as die of this disease, in whom the eyes are much affected."

30. The NEPHRITIC state of fever is often induced by calculi, but it frequently occurs in the gout, small-pox, and malignant states of fever. There is such an engorgement, or choaking of the vessels of the kidneys, that the secretion of the urine is sometimes totally obstructed, so that the bladder yields no water to the catheter. It is generally accompanied with a full or tense pulse, great pain, sickness, or vomiting, high coloured urine, and a pain along the thigh and leg, with occasionally a retraction of one of the testicles. It exists sometimes without any pain. Of this I met with several instances in the yellow fever of 1793.

31. The

31. The DROPSY, whether local or general is a *state* of fever. There are several states of fever which are more frequently accompanied by serous effusions than others. These are the scarlet, the puerperal, and the rheumatic states of fever. They all dispose to effusions in the *limbs*. Intermittents tend to produce those conjections in the abdominal viscera which terminate in effusions in the *belly*. A neglected catarrh, and a half cured pneumonia, tend to produce effusions in the *thorax*, while a chronic phrenitis relieves itself by an effusion of water in the *brain*. Nineteen dropsies, out of twenty appear to be original arterial diseases; and the water, which has been supposed to be the cause of the dropsy, is as much the effect of preternatural and morbid action in the blood-vessels, as pus, gangrene, and schirrus are of previous inflammation. The common febrile symptoms which accompany dropsy, render this highly probable; but it has lately been demonstrated by dissection, by Mr. Samuel Cooper, the apothecary of the Pennsylvania hospital, in a man who died of an ascites. Pus and blood, as well as water, were found in the cavity of the abdomen.*

* The origin of dropsy, in the neglect of blood-letting in fevers, has been ascertained by many observations; hence that disease occurs most frequently where bleeding is seldom used. Dr. Wilkes mentions a fact which is directly to our purpose. "After the last epidemical fever (says the Doctor),

It

It is no objection to this theory of dropsy, that we sometimes find water in the cavities of the body after death, without any marks of inflammation on the contiguous blood-vessels. We often find pus both in the living and dead body under the same circumstances, where we are sure it was preceded by inflammation.

33. The ERUPTIVE state of fever includes the small-pox, measles, and all the other exanthemata of Dr. Cullen.

33. The HÆMORRHAGIC state of fever is always the effect of preternatural excitement in the blood-vessels. Hæmorrhages have been divided into active and passive. It would be more proper to divide them, like other states of general fever, into hæmorrhages of strong and feeble morbid action. There is seldom an issue of blood from a vessel in which there does not exist preternatural or accumulated excitement. We observe this hæmorrhagic state of fever most frequently in malignant fevers, in pulmonary consumption, in pregnancy, and in that period of life in which the menses cease to be regular.

which began at Kidderminster in 1728, and soon after spread, not only over Great Britain, but all Europe, more people died dropsical in three years, than did perhaps in 20, or 30 years before."

Historical Essay on the dropsy, p. 326.

33. The

34. The AMENORRHAGIC state of fever occurs more frequently than is suspected by physicians. A full and quick pulse, thirst, and preternatural heat, often accompany a chronic obstruction of the menses. The inefficacy and even hurtful effects, of what are called emenagogue medicines, in this state of the system, without previous depletion, shew the propriety of introducing it among the different states of fever.

35. The hæmorrhoids are frequently a local disease, but they are sometimes accompanied with pain, giddiness, chills and an active pulse. When this is the case, I have given them the name of the HEMORRHOIDAL state of fever.

36. The ophthalmia when it occurs with the symptoms of general fever, may properly be considered as an OPHTHALMIC state of fever.

We come now in the third and last place to mention the *misplaced* states of fever. The term is not a new one in medicine. We read of misplaced gout. Morbid excitement, in several other states of fever, is equally liable to be translated from the blood-vessels to other parts of the system. The periodical pains in the head, eyes, ears, jaws, hips and back, which occur in the sickly autumnal months,

months, and which impart no fulness, force, or frequency to the pulse, are all misplaced fevers. But there are other morbid affections which are less suspected of belonging to febrile disorders. These are,

37. The **HEPATIC** state of fever. The causes, symptoms, and remedies of the liver disorder of the East Indies, as mentioned by Dr. Gravenstine, all prove that it is nothing but a bilious fever translated from the blood-vessels, and absorbed, or suffocated as it were in the liver. This view of the chronic hepatitis is important, inasmuch as it leads to the liberal use of all the remedies which cure bilious fever. Gall stones and contusions, now and then produce a hepatitis, but under no other circumstances do I believe it ever exists, but as a symptom of general, or latent fever.

38. The **CONVULSIVE** or *spasmodic* state of fever. Convulsions it is well known often usher in fevers, more especially in children. But the connection between spasmodic affections, and fever in adults has been less attended to by physicians. The same causes which produced general fever and hepatitis in the East Indies, in some soldiers, produced locked jaw in others. Several of the symptoms of this disorder as described by Dr. Girdlestone, such as coldness

on

on the surface of the body, cold sweats on the hands and feet, intense thirst, a white tongue, incessant vomitings, and carbuncles, all belong to the malignant state of fever.* By means of blood-letting, and the other remedies for the violent state of bilious fever, I have seen the convulsions in this disorder, translated from the muscles to the blood-vessels, where they immediately produced *all* the common symptoms of fever.

39. The HYSTERICAL and HYPOCHONDRIACAL states of fever. The former is known by a rising in the throat, which is for the most part erroneously ascribed to worms, by pale urine, and by a disposition to shed tears, or to laugh upon trifling occasions. The latter discovers itself by false opinions of the nature and danger of the disease under which the patient labours. Both these states of the nervous system occur frequently in the gout and in the malignant state of fever. It is common to say, in such cases, that patients have a complication of diseases; but this is not true, for the hysterical and hypochondrical symptoms are nothing but the effects of one remote cause, concentrating its force chiefly upon the nerves, and muscles. It was in this state of fever that patients sat up, walked about their

* Essay on the Spasmodic Affections in India, p. 53. 54. 55.

rooms, and even went out into the streets a few hours before they died, in the epidemic of 1793 in Philadelphia.

40. The CUTANEOUS state of fever. Dr. Sydenham calls a dysentery a “febris introversa.” Eruptions of the skin are often nothing but the reverse of this introverted fever. They are a fever translated to the skin; hence we find them most common in those countries and seasons in which fevers are epidemic. The prickly heat, the rash, and the effete of authors, are all states of misplaced fever. “Agues, fevers, and even *pleurisies* (says Mr. Townsend in his journey through Spain *) are said often to terminate in scabies, and this frequently gives place to them, returning however when the fever ceases. In adults it takes possession of the hands and arms, with the legs and thighs, covering them with a filthy crust.” Small boils are common among the children in Philadelphia, at the time the *colera infantum* makes its appearance. These children always escape the summer epidemic. The elephantiasis described by Dr. Hillary in his account of the diseases of Barbadoes, is evidently a translation of an intermittent to one of the limbs. It is remarkable that the leprosy and malignant fevers of

* Vol. II. Dublin edition, p. 262.

all kinds have appeared and declined together in the same ages and countries. But further, petechiæ sometimes appear on the skin without fever. Cases of this kind with, and without hæmorrhages, are taken notice of by Riverius,* Dr. Duncan, and many other practical writers. They are cotemporary, or subsequent to fevers of a malignant complexion. They occur likewise in the scurvy. From some of the predisposing, remote and exciting causes of this disease, and from its symptoms and remedies, I have suspected it, like the petechiæ mentioned by Riverius, to be originally a fever generated by human miasmata, in a misplaced state. The hæmorrhages which sometimes accompany the scurvy, certainly arise from a morbid state of the blood-vessels. The heat, and quick pulse of fever, are probably absent, only because the preternatural excitement of the whole sanguiferous system is confined to those extreme or cutaneous vessels which pour forth blood. In like manner the fever of the small-pox deserts the blood-vessels, as soon as a new action begins on the skin. Or perhaps the excitability of the larger blood-vessels may be so far exhausted by the long, or forcible impression of the remote and predisposing causes of the scurvy, as to be incapable of undergoing the convulsive action of general fever.

* *Praxis Medica*, lib. xviii. cap. i.

With this, I close my inquiry into the proximate cause of fever. It is imperfect from its brevity, as well as from other causes. I commit it to my pupils to be corrected and improved.

“ We think our fathers fools, so wise we grow.

“ Our wiser sons *I hope* will think us so.”

A

D E F E N C E

OF

BLOOD-LETTING

AS A

R E M E D Y

FOR

CERTAIN DISEASES.

DEFENCE, &c.

BEFORE I proceed to the Defence of Blood-letting as a remedy for certain diseases, particularly for fevers, it will be necessary to introduce a syllabus of all the usual remedies for fever, in its ordinary state. They consist,

I. Of such things as lessen, by the abstraction of stimulus, the morbid and excessive action of the blood-vessels.

II. Of such, as by exciting action in the stomach, bowels, brain, nerves, muscles, and skin, equalize the excitement of the whole system, and thereby indirectly destroy a weak but morbid action in the blood-vessels, by imparting to them a more vigorous and healthy action.

I. The remedies which belong to the FIRST general head are,

I. Evacuants. These are,

1. Blood-letting.
2. Vomits.
3. Purges.
4. Sweating medicines.
5. A salivation.
6. Blisters.

II. Remedies which abstract the stimulus

- of heat by
 1. cold air,
 2. cold water, and,
 3. ice,
 4. abstinence.
- of food by
 5. silence and darkness.
- of invigorating passions by
 6. moderate fear.
- of motion by
 7. rest.
- of acrimony by
 8. diluting drinks, and,
 9. cleanliness.

III. Remedies which divert local congestion, inflammation, and serous effusion from vital parts, to such as are less essential to life. These are all such as are mentioned under the head of evacuants, particularly a salivation and blisters.

IV. Medicines said to possess sedative powers, such as

1. Nitre, and other neutral salts.

2. Certain

2. Certain preparations of antimony.
3. Sugar of lead.
4. Fox-glove.
5. Applications of sweet oil to the external surface of the body.

II. The remedies which belong to the SECOND general head, are stimulants. These divide themselves naturally into such as are internal, and such as are external.

I. The internal stimulants may further be divided into medicines and aliments. The medicines are

1. All fermented and distilled liquors.
2. Volatile alkali.
3. Empyreumatic and aromatic oils.
4. Opium.
5. Æther.
6. Bark, and bitters of all kinds.
7. Mercury.
8. Pure air.
9. The invigoration of the passions and understanding.

The aliments include such vegetable and animal matters, as are commonly used in diet, together with sago, saloop, tapioca, and the like.

II. The

II. The external stimulants are

1. Several of the internal stimulants so prepared, as to be applied to different parts of the body, as the nose, the temples, the external regions of the stomach and bowels, the limbs, and the lower intestines, by way of glyster.
2. The cold and warm baths.
3. Blisters.
4. Cataplasms of onions, garlic, and mustard, to the feet.
5. Caustics.
6. Boiling water.

I return now, agreeably to the title of this essay, to consider BLOOD-LETTING as a remedy for fevers, and certain other diseases. In treating of the comparative advantages of blood-letting, I shall be under the necessity of making a few remarks upon each of the remedies set down in the syllabus, under the head of evacuants.

I shall begin this subject by remarking, that blood-letting is indicated in the inflammatory state of fever,

1. By the sudden suppression or diminution of the natural discharges by the pores, bowels, and kidneys, whereby a plethora is induced in the system.

2. By

2. By the robust habits of the persons who are most subject to the inflammatory state of fever.

3. By the proximate cause of fever. I have attempted to prove that the inflammatory state of fever depends upon morbid and excessive action in the blood-vessels. It is connected, of course, with preternatural sensibility in their muscular fibres. The blood is one of the most powerful stimuli which act upon them. By abstracting a part of it, we lessen the principal cause of the fever. The effect of blood-letting is as immediate and natural in removing fever, as the abstraction of a particle of sand is to cure an inflammation of the eye, when it arises from that cause.

4. By the symptoms of the first stage of this state of fever, such as a sleepiness and an oppressed pulse, or by delirium, with a throbbing pulse and great pains, in every part of the body.

5. By the rupture of the blood-vessels, which takes place from the quantity or impetus of the blood in inflammatory fever. Let no one call bleeding a cruel or unnatural remedy. It is one of the specifics of nature; but in the use of it she seldom affords much relief. She frequently pours the stimulating and oppressing mass of blood into the lungs and

and brain; and when she finds an outlet for it through the nose, it is discharged either in such a deficient or excessive quantity, as to be useless or hurtful. By artificial blood-letting, we can choose the *time* and *place* of drawing blood, and we may regulate its quantity by the degrees of action in the blood-vessels. The disposition of nature to cure the inflammatory state of fever by depletion, is further manifested by her substituting, in the room of blood-letting, large, but less safe and less beneficial, evacuations from the stomach and bowels.

6. By the relief which is obtained in fevers of violent action by remedies of less efficacy (to be mentioned hereafter) which act indirectly in reducing the force of the sanguiferous system.

7. By the immense advantages which have attended the use of blood-letting in the inflammatory state of fever, when used at a proper time, and in a quantity suited to the force of the disease. I shall briefly enumerate these advantages.

1. It frequently strangles a fever when used in its forming state, and thereby saves much pain, time, and expense to a patient.

2. It imparts strength to the body, by removing the pressure of indirect debility. It moreover obviates

viates a disposition to faint, which arises from this state of the system.

3. It reduces the uncommon frequency of the pulse. The loss of ten ounces of blood reduced Miss Sally Eyre's pulse from 176 strokes to 140 in a few minutes, in the fever of the year 1794.

4. It renders the pulse more frequent when it is preternaturally slow.

5. It checks the nausea and vomiting which attend the malignant state of fever. Of this I saw many instances in the year 1794. Dr. Poissonnier Desperrieres confirms this remark in his Account of the Fevers of St. Domingo ; and adds further, that it prevents, when sufficiently copious, the troublesome vomiting which often occurs on the fifth day of the yellow fever. *

6. It renders the bowels, when costive, more easily moved by purging physic.

7. It renders the action of mercury more speedy and more certain in exciting a salivation.

* *Traité des fièvres de L'île de St. Domingue.* Vol. II. p. 76.

8. It disposes the body to sweat spontaneously, or renders diluting and diaphoretic medicines more effectual for that purpose.

9. It *suddenly* removes a dryness, and *gradually* a blackness, from the tongue. Of the former effect of bleeding, I saw two instances, and of the latter, one, during the autumn of 1794.

10. It removes or lessens pain in every part of the body, and more especially in the head.

11. It removes or lessens the burning heat of the skin, and the burning heat in the stomach, so common and so distressing in the yellow fever.

12. It removes a constant chilliness which sometimes continues for several days, and which will neither yield to cordial drinks, nor warm bed-cloaths.

13. It checks such sweats as are profuse without affording relief, and renders such as are partial and moderate, universal and salutary.

14. It sometimes checks a diarrhoea and tenesmus, after astringent medicines have been given to no purpose. This has often been observed in the measles.

15. It

15. It suddenly cures the intolerance of light which accompanies many of the inflammatory states of fever.

16. It removes coma. Mr. Henry Clymer was suddenly relieved of this alarming symptom in the fever of 1794, by the loss of twelve ounces of blood.

17. It induces sleep. This effect of bleeding is so uniform, that it obtained, in the year 1794, the name of an anodyne in several families. Sleep sometimes stole upon the patient while the blood was flowing.

18. It prevents effusions of serum and blood. Hæmorrhages seldom occur where bleeding has been sufficiently copious.

19. It belongs to this remedy to prevent the chronic diseases of cough, consumption, jaundice, abscess in the liver, and all the different states of dropsy which so often follow autumnal fevers.

My amiable friend Mrs Lenox, furnished an exception to this remark in the year 1794. After having been cured of the yellow fever by seven bleedings, she was affected, in consequence of taking a ride,

a ride, with a slight return of fever, accompanied by an acute pain in the head, which I was afraid would end in a dropsy of the brain. As her pulse was tense and quick, I advised repeated bleedings to remove it. This prescription, for reasons which it is unnecessary to relate, was not followed at the time, or in the manner, in which it was recommended. The pain, in the mean time, became more alarming. In this situation, two physicians were proposed by her friends to consult with me. I objected to them both, because I knew their principles and modes of practice to be contrary to mine, and that they were proposed only with a view of wresting the lancet from my hand. From this desire of avoiding a controversy with my brethren, where conviction was impossible on either side, as well as to obviate all cause of complaint by my patient's friends, I offered to take my leave of her, and to resign her wholly to the care of the two gentlemen who were proposed to attend her with me. To this she objected in a decided manner. But that I might not be suspected of an undue reliance upon my own judgment, I proposed to call upon Dr. Griffitts or Dr. Physick to assist me in my attendance upon her. Both these physicians had renounced the prejudices of the schools in which they had been educated, and had conformed their principles and practice to the present improving state of medical science. My

patient preferred Dr. Griffitts, who in his first visit to her, as soon as he felt her pulse, proposed more bleeding. The operation was performed by the Doctor himself, and repeated daily for five days afterwards. From an apprehension that the disorder was so fixed as to require some aid to blood-letting, we gave her calomel in such large doses as to excite a salivation. By the use of these remedies she recovered slowly, but so perfectly as to enjoy her usual health.

20. Bleeding prevents the termination of the inflammatory, in the gangrenous and chronic states of fever. This effect of blood-letting will enable us to understand some things in the writings of Dr. Morton, and Dr. Sydenham which at first sight appear to be unintelligible. Dr. Morton describes what he calls a putrid fever, which was epidemic, and fatal in the year 1678. Dr. Sydenham, who practised in London at the same time, takes no notice of this fever. The reason of his silence is obvious. By copious bleeding he prevented the fever of that year from running on to the gangrenous state, while Dr. Morton by neglecting to bleed, created the supposed putrid fevers which he has described.

It has been common to charge the friends of blood-letting with *temerity* in their practice. From this view which has been given of it, it appears that

it would be more proper to ascribe *timidity* to them, for they bleed to prevent the offensive and distressing consequences of neglecting it, which have been mentioned.

21. It cures without permitting a fever to put on those alarming symptoms, which excite constant apprehensions of danger and death in the minds of patients and their friends. It is because these alarming symptoms are prevented, by bleeding, that patients are sometimes unwilling to believe they have been cured by it, of a malignant fever. Thus the Syrian Leper of old, viewed the water of Jordan as too simple, and too common to cure a formidable disease, without recollecting that the remedies for the greatest evils of life are all simple, and within the power of the greatest part of mankind.

22. It prepares the way for the successful use of the bark and other tonic remedies, by destroying, or so far weakning, a morbid action in the blood-vessels, that a medicine of a moderate stimulus afterwards exceeds it in force, and thereby restores equable and healthy action to the system.

23. Bleeding prevents relapses. It moreover prevents that predisposition to the intermitting, and pleuritic states of fever which so frequently attack persons

persons in the spring, who have had the bilious remitting fever in the preceding autumn.

But great and numerous as the advantages of blood-letting are in fevers, there have been many objections to it. I shall briefly enumerate, and endeavour to refute the errors upon this subject.

Blood-letting has been forbidden by physicians, by the following circumstances, and states of the system.

1. By warm weather. Galen bled in a plague, and Aræteus in a bilious fever, in a warm climate. Dr. Sydenham and Dr. Hillary, inform us that the most inflammatory fevers occur in, and succeed hot weather. Dr. Cleghorn prescribed it copiously in the warm months, in Minorca. Dr. Moseley cured the yellow fever by this remedy in Jamaica. Dr. Broadbelt and Dr. Weston in the same Island have lately adopted his successful practice. Dr. Desportes speaks in the highest terms of it in all the inflammatory diseases of St. Domingo. He complains of the neglect of it in the rheumatism, in consequence of which he says, the disease produces abscesses in the lungs.* I have never in any

* P. 35.

year of my practice, been restrained by the heat of summer in the use of the lancet, where the pulse has indicated it to be necessary, and have always found the same advantages from it, as when I have prescribed it in the winter or spring months.

The relaxation and debility of the body in warm weather, and in hot climates, has not been understood until lately, to be of the indirect kind. Of course, instead of forbidding, it requires depletion to remove it. It is lessened at all times by abstemious living, and by gentle doses of physic, but when the stimulus of a fever is added to that of the heat of the sun, blood-letting is often more necessary to remove it, than it is in cool weather, or in temperate climates.

2. Being born, and having lived in a warm climate. This is so far from being an objection to blood-letting in an inflammatory disease, that it renders it more necessary. I think I have lost several West India patients from the influence of this error.

3. Great apparent weakness. This, in acute and violent fevers is always of the indirect kind. It is induced by pressure upon the sources of strength in the muscles. It resembles in so many particulars that weakness, which is the effect of the abstraction
of

of stimulus, that it is no wonder they have been confounded by physicians. This sameness of symptoms from opposite states of the system is taken notice of by Hippocrates. He describes convulsions, and particularly a hiccup as occurring equally from repletion and inanition which answer to the modern terms of indirect, and direct debility. The natural remedy for the former is depletion, and no mode of depleting is so effectual or safe as blood-letting. But, the great objection to this remedy is when the inflammatory state of fever, affects persons of delicate constitutions, and such as have long been subject to direct debility of the chronic kind. In this state of the system, there is the same morbid and preternatural action in the blood-vessels, that there is in persons of robust habits, and the same remedy is necessary to subdue it in both cases. It is sometimes indicated in a larger quantity in weakly, than in robust people, by the plethora which is more easily induced in their relaxed, and yielding blood-vessels, and by the greater facility with which ruptures and effusions take place in their viscera. Thus it is more necessary to throw overboard, a large part of the cargo of an old and leaky vessel in a storm, than of a new and strong one. I know that vomits, purges, sweats, and other evacuating remedies, are preferred to bleeding in weakly constitutions, but I hope to shew hereafter, that bleeding is not only more effectual,

fectual, but more safe in such habits, than any other depleting remedy.

4. Infancy and childhood. This is so far from being an objection to bleeding, that the excitable state of the blood-vessels in those periods of life, renders it peculiarly necessary in their inflammatory diseases. Dr. Sydenham bled children in the hooping cough, and in dentition. I have followed his practice, and bled as freely in the inflammatory state of fever in infancy as in middle life. I bled my eldest daughter when she was but six weeks old, for convulsions brought on by an excessive dose of laudanum given to her by her nurse; and I bled my youngest son twice before he was two months old, for an inflammatory fever which fell upon his lungs and bowels. In both cases, life appeared to be saved by this remedy.

5. Old age. The increase of appetite in old people, their inability to use sufficient exercise, whereby their blood-vessels become relaxed, plethoric and excitable, and above all, the translation of the strength of the muscles to the arteries, and of plethora to the veins, all indicate bleeding to be more necessary (in equal circumstances) in old than in middle aged people. I am not the author of this opinion. Botallus left a testimony in favor of it
nearly

nearly 200 years ago,* and it has since been confirmed by the experience of Hoffman, and many other physicians. An ignorance of, or inattention to this change in the state of the blood-vessels, in persons in the decline of life, and the neglect of the only remedy indicated by it, is probably the reason why diseases often prove fatal to them, which in early, or middle life cured themselves, or yielded to a single dose of physic, or a few ounces of bark.

6. The time of menstruation. The system during this period is plethoric and excitable, and of course disposed to a violent degree of inflammatory fever, from all the causes which excite it. Bleeding therefore is more indicated in an inflammatory state of fever, at this time, than at any other. Formerly the natural discharge from the uterus was trusted to, to remove a fever contracted during the time of menstruation. But what relief can the discharge of four or five ounces of blood from the uterus afford, in a fever which requires the loss of 50, or perhaps of an 100 ounces to cure it?

7. PREGNANCY. The distention induced upon the uterus directly, and indirectly upon the whole

* *Magis esse adjuvandos senes, missione sanguinis dum morbus postulat, aut corpus eorum habitus malus est, quam ubi hæc (quod absonum videbitur) juvenibus contingunt.*

De Cur. per Sang. missionem, cap. 11. § 11.

system by the foetus, renders bleeding in the inflammatory state of fever, more necessary than at other times. I have elsewhere mentioned the advantages of bleeding pregnant women, in the yellow fever. I did not learn the advantages of the practice in that disease. I bled Mrs. Philler 11 times in seven days, in a pleurisy during her pregnancy, in the month of March 1783. Mrs. Fiss, was bled 13 times in the spring of 1783; and Mrs. Kirby 16 times in the same condition by my orders in the winter of 1786, in a similar disease. All these women recovered, and the children they carried during their illness, are at this time alive, and in good health.

8. Fainting after bleeding. This symptom is accidental in many people. No inference can be drawn from it against blood-letting. It often occurs after the first and second bleedings in a fever, but in no subsequent bleeding, though it be repeated a dozen times. Of this I saw several instances in the yellow fever of 1794. The pulse during the fainting, is often tense and full.

9. Coldness of the extremities, and of the whole body. This cold state of fever when it occurs early, yields more readily to bleeding, than to the most cordial medicines.

10. Sweats are supposed to forbid blood-letting. I have seen two instances of death, from leaving a paroxysm of malignant fever to terminate itself by sweating. Dr. Sydenham has taught a contrary practice in the following case. “ While this constitution (says the Doctor) prevailed, I was called to Dr. Morice, who then practised in London. He had this fever, attended with profuse sweats and numerous petechiæ. By the consent of some other physicians, our joint friends, he was bled, and rose from his bed, his body being first wiped dry. He found immediate relief from the use of a cooling diet and medicines, the dangerous symptoms soon going off; and by continuing this method he recovered in a few days.”* In the same fever, the Doctor adds further, “ For though one might expect great advantages in pursuing an indication taken from what generally proves serviceable (viz. *sweating*), yet I have found by constant experience, that the patient not only finds no relief, but contrariwise, is more heated thereby; so that frequently a delirium, petechiæ, and other very dangerous symptoms immediately succeed such *sweats*.†

Morgagni describes a malignant fever which prevailed in Italy, in which the patients died in profuse sweats, while their physicians were looking for

* Wallis’s edition, Vol. I. p. 210.

† Vol. I. p. 208; a crisis

a crisis from them. Bleeding would probably have checked these sweats and cured the fever.

11. Dissolved blood, and an absence of an inflammatory crust on its crassamentum. I shall hereafter place dissolved blood at the highest point of a scale, which is intended to mark the different degrees of inflammatory diathesis in the system. I have mentioned in the inquiry into the proximate cause of fever, that it is the effect of a tendency to a palsy, induced by the violent force of impression upon the blood-vessels. This appearance of the blood in certain states of fever, instead of forbidding bleeding, is the most vehement call of the system for it. Nor is the absence of a crust on the crassamentum of the blood, a proof of the absence of inflammatory diathesis, or a signal to lay aside the lancet. On the contrary, I shall shew hereafter, that there are several appearances of the blood which indicate more morbid action in the blood-vessels than a sify or inflammatory crust.

12. An undue proportion of serum to crassamentum in the blood. This predominance of water in the blood has often checked sufficient blood-letting. But it should be constantly disregarded while it is attended with those states of pulse (to be mentioned hereafter) which require bleeding.

13. The

13. The presence of petechiæ on the skin. These, I have elsewhere said, are the effects of the gangrenous state of fever. Dr. Sydenham and Dr. de Haen have taught the safety and advantage of bleeding, when these spots are accompanied by an active pulse. A boy of Mr. John Carrol owes his recovery from the small-pox to the loss of fifty ounces of blood, by five bleedings, at a time when nearly every pock on his arms and legs had a purple appearance. Lewis XIV. was bled five times in the small-pox, when he was only thirteen years of age, and thereby probably saved from the grave, to the great honour and emolument of the single physician who urged it against the advice of all the other physicians of the court. Dr. Cleghorn mentions a single case of the success of bleeding in the petechial small-pox. His want of equal success afterwards, in similar cases, was probably occasioned by his bleeding too sparingly, that is, but three or four times.

Abscesses and sore breasts, which accompany or succeed fever, are no objections to blood-letting, provided the pulse indicates the continuance of inflammatory diathesis. They depend frequently upon the same state of the system, as livid effusions on the skin.

14. The long duration of fever. Inflammatory diathesis is often protracted for many weeks, in the chronic

chronic state of fever. It moreover frequently revives after having disappeared, from an accidental stimulus affecting some part of the body, particularly the lungs and brain. I bled a young man of James Cameron, in the autumn of 1794, four times between the 20th and 30th days of a chronic fever, in consequence of a pain in the side, accompanied by a tense pulse, which suddenly came on after the 20th day of his disease. His blood was sify. His pain and tense pulse were subdued by the bleeding, and he recovered. I wish this case to be attended to by young practitioners. The pulmonary consumption is often the effect of a chronic fever, terminating with fresh inflammatory symptoms, by effusions in the lungs. It may easily be prevented, by forgetting the number of the days of our patient's fever, and treating the pulmonary affection as if it were a recent complaint.

15. Tremors and slight convulsions in the limbs. Bark, wine, laudanum, and musk are generally prescribed to remove these symptoms; but to be effectual, they should, in most cases, be preceded by the loss of a few ounces of blood.

16. Bleeding is forbidden after the 5th or 7th day in a pleurisy. This prohibition was introduced into medicine at a time when a fear was entertained

tained of arresting the progress of nature in preparing and expelling morbific matter from the system. From repeated experience I can assert, that bleeding is safe in every stage of pleurisy in which there is pain and a tense and oppressed pulse ; and that it has, when used for the first time after the 5th and 7th days, saved many lives.

17. The loss of a sufficient quantity of blood is often prevented by patients being apparently *worse*, after the first or second bleeding. This change for the worse shews itself in some one or more of the following symptoms, viz. increase of heat, chills, delirium, haemorrhages, convulsions, nausea, vomiting, faintness, coma, great weakness, pain, a tense after a soft pulse, and a reduction of it in force and frequency. They are all occasioned by the system rising suddenly from a state of extreme depression, in consequence of the abstraction of the pressure of the blood to a state of vigour and activity, so great in some instances, as to re-produce a depression below what existed in the system before a vein was opened ; or it is occasioned by a translation of morbid action from one part of the body to another.

The chills which follow bleeding are the effects of a change in the fever, from an uncommon to a common

common state of malignity. They occur chiefly in those violent cases of fever which come on without a chilly fit.

The hæmorrhages produced by bleeding, are chiefly from the nose, hæmorrhoidal vessels, or uterus, and of course are, for the most part, safe.

Uncommon weakness succeeding blood-letting, is the effect of sudden indirect debility induced upon the whole system, by the cause before mentioned, or of a sudden translation of the excitement of the muscles into the blood-vessels, or some other part of the body. These symptoms, together with all the others which have been mentioned, are so far from forbidding, that they all most forcibly indicate a repetition of blood-letting.

I shall briefly illustrate, by the recital of three cases, the good effects of bleeding, in removing pain, and the preternatural flowness, and weakness of the pulse, when produced by the use of that remedy.

In the month of June of 1795, I visited Dr. Say in a malignant fever, attended with pleuritic symptoms, in consultation with Dr. Physick. An acute pain in his head followed six successive bleedings. After a seventh bleeding he had no pain. His fever soon afterwards

afterwards left him. In thus persevering in the use of a remedy which, for several days, appeared to do harm, we were guided wholly by the state of his pulse, which uniformly indicated, by its force, the necessity of more bleeding.

In the autumn of 1794, I was sent for to visit Samuel Bradford, a young man of about 20 years of age, son of Mr. Thomas Bradford, who was ill with the reigning malignant epidemic. His pulse was at 80. I drew about 12 ounces of blood from him. Immediately after his arm was tied up, his pulse fell to 60 strokes in a minute. I bled him a second time, but more plentifully than before, and thereby, in a few minutes, brought his pulse back again to 80 strokes in a minute. A third bleeding the next day, aided by the usual purging physic, cured him in a few days.

In the month of March 1795, Dr. Physick requested me to visit, with him, Mrs. Fries, the wife of Mr. John Fries, in a malignant fever. He had bled her four times. After the fourth bleeding, her pulse suddenly fell, so as scarce to be perceptible. I found her hands and feet cold, and her countenance ghastly, as a person's in the last moments of life. In this alarming situation, I suggested nothing to Dr. Physick but to follow his judgment, for I knew that he was master of that law of the animal economy which

which resolved all her symptoms into an oppressed state of the system. The Doctor decided in a moment in favour of more bleeding. During the flowing of the blood, the pulse rose. At the end of three, ten, and seventeen hours it fell, and rose again by three successive bleedings, in all of which she lost about thirty ounces of *fizy* blood. So great was the vigour acquired by the pulse, a few days after the paroxysms of depression, which have been described, were relieved, that it required seven more bleedings to subdue it. I wish the history of these two cases to be carefully attended to by the reader. I have been thus minute in the detail of them, chiefly because I heard of several practitioners who, I am persuaded, have lost patients by attempting to raise a pulse that had been depressed by bleeding, in a malignant fever, by means of cordial medicines, instead of the repeated use of the lancet. The practice is strictly rational; for in proportion as the blood-vessels are weakened by pressure, the quantity of blood to be moved should be proportioned to the diminution of their strength.

It is remarkable that this depressed state of the pulse, whether induced by a paroxysm of fever, or by blood-letting, is sometimes attended with a strong pulsation of the arteries in the bowels and head.

I have mentioned among the apparent bad effects of bleeding, that it sometimes changes a soft into a tense pulse. Of this I saw a remarkable instance in Captain John Barry in the autumn of 1795. After the loss of 130 ounces of blood in a malignant yellow fever, his pulse became so soft as to indicate no more bleeding. In this situation he remained for three days, but without mending as rapidly as I expected from the state of his pulse. On the 4th day he had an hæmorrhage from his bowels, from which he lost above a pint of blood. His pulse now suddenly became tense, and continued so for two or three days. I ascribed this change in his pulse to the vessels of the bowels, which had been oppressed by congestion, being so much relieved by the hæmorrhage, as to resume an inflammatory action. It is thus we see the blood-vessels, in a common phlegmon, travel back again from a tendency to mortification, to the red colour and pain of common inflammation.

From a review of the commotions excited in the system by bleeding, a reason may be given why the physicians who do not bleed in the depressed state of the pulse, have so few patients in what they call malignant fevers, compared with those who use a contrary practice. The disease, in such cases, being locked up, is not permitted to unfold its true cha-

racter ; and hence patients are said to die of apoplexy, lethargy, colera, dysentery, or nervous fever, who, under a different treatment, would have exhibited all the marks of an ordinary malignant fever.

In obviating the objections to blood-letting from its apparent evils, I have said nothing of the apparent bad effects of other remedies. A nausea is often rendered worse by an emetic, and pains in the bowels are increased by a purge. But these remedies notwithstanding maintain, and justly too, a high character among physicians.

18. Bleeding has been accused of bringing on a nervous, or the chronic state of fever. The use of this remedy, in a degree so moderate as to obviate the putrid or gangrenous state of fever only, may induce the chronic state of fever ; for it is the effect, in this case, of the remains of inflammatory diathesis in the blood-vessels ; but when blood is drawn proportioned to the morbid action in the system, it is impossible for a chronic fever to be produced by it. Even the excessive use of blood-letting, however injurious it may be in other respects, cannot produce a chronic fever, for it destroys morbid action altogether in the blood-vessels.

19. Bleed-

19. Bleeding has been charged with being a weakening remedy. I grant that it is so, and in this its merit chiefly consists. The morbid action of the blood-vessels must be subdued in part, in an inflammatory fever, before tonic remedies can be given with safety or advantage. Now this is usually attempted by depleting medicines, to be mentioned hereafter, or it is left to time and nature, all of which are frequently either deficient or excessive in their operations ; whereas bleeding, by suddenly reducing the morbid action of the blood-vessels to a wished-for-point of debility, saves a great and unnecessary waste of excitability, and thus prepares the body for the exhibition of such cordial remedies as are proper to remove the debility which predisposed to the fever.

20. It has been said that bleeding renders the habitual use of it necessary to health and life. This objection to blood-letting is founded upon an ignorance of the difference between the healthy and morbid action of the blood-vessels. Where blood is drawn in health, such a relaxation is induced in the blood-vessels, as to favour the formation of plethora, which may require habitual bleeding to remove it ; but where blood is drawn only in the inflammatory state of fever, the blood-vessels are reduced from a morbid degree of strength to that

which is natural ; in which state no predisposition to plethora is created, and no foundation laid for periodical blood-letting.

21. It has been said that bleeding, more especially where it is copious, predisposes to effusions of serum in the lungs, chest, bowels, limbs, and brain. In replying to this objection to bleeding, in my public lectures, I have addressed by pupils in the following language : “ Ask the poor patients who come panting to the door of our hospital, with swelled legs and hard bellies, every fall, whether they have been too copiously bled, and they will all tell you, that no lancet has come near their arms. Ask the parents who still mourn the loss of children who have died in our city of the internal dropsy of the brain, whether they were destroyed by excessive blood-letting ? If the remembrance of the acute sufferings which accompanied their sickness and death will permit these parents to speak, they will tell you, that every medicine, except bleeding, had been tried to no purpose in their children’s disorders. Go to those families in which I have practised for many years, and inquire, whether there is a living or a dead instance of dropsy having followed, in any one of them, the use of my lancet ? Let the undertakers and grave-diggers bear witness against me, if I have ever, in the course of my practice, conveyed the body,

body of a single dropsical patient into their hands, by excessive blood-letting?" No. Dropsies, like abscesses and gangrenous eruptions upon the skin, arise, in most cases, from the *want* of sufficient bleeding in inflammatory diseases. Debility, when of a direct kind, whether induced by art or nature, seldom disposes to effusion. Who ever heard of dropsy succeeding famine? And how rarely do we see it accompany the extreme direct debility of old age?

"If ever bleeding kills," says Botallus, either directly or indirectly, through the instrumentality of other diseases, "it is not from its excess, but because it is not drawn in a sufficient quantity, or at a proper time."* And again, says this excellent writer, "One hundred thousand men perish from the want of blood-letting, or from its being used out of time, to one who perishes from too much bleeding, prescribed by a physician."†

It is remarkable, that the dread of producing a dropsy by bleeding, is confined chiefly to its use in malignant fevers; for the men who urge this objection to it, do not hesitate to draw four or five quarts of blood in the cure of pleurisy, and of a strangu-

* Cap. viii. § 4.

† Cap. xxxvi. § 4.

lated hernia. The habitual association of the lancet with the former of those disorders, has often caused me to rejoice when I have heard a patient complain of a pain in his side in a malignant fever. It insured to me his consent to the frequent use of the lancet, and it protected me, when it was used unsuccessfully, from the clamours of the public, for few people censure copious bleeding in a pleurisy.

22. Evacuating remedies of another kind have been said to be more safe, and equally effectual, in reducing the inflammatory state of fever. I shall recapitulate each of those evacuating remedies, and then draw a comparative view of their effects with blood-letting. They are,

I. Vomits.

II. Purges.

III. Sweats.

IV. Salivation. And,

V. Blisters.

I. Vomits have often been effectual in curing fevers of a mild character. They discharge offensive

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five and stimulating matters from the stomach ; they lessen the fulness of the blood-vessels, by determining the serum of the blood through the pores ; and they equalize the excitement of the system, by inviting its excessive degrees from the blood-vessels to the stomach and muscles. But they are,

1. Uncertain in their operation, from the torpor induced by the fever upon the stomach.
2. They are unsafe in many conditions of the system, as in pregnancy and a disposition to apoplexy and ruptures. Life has sometimes been destroyed by their inducing cramp, hæmorrhage, and inflammation in the stomach.
3. They are not subject to the controul of a physician, often operating more or less than was intended by him, or indicated by the disease.
4. They are often ineffectual in mild, and always so in fevers of great inflammatory action.

II. Purges are useful in discharging acrid fæces and bile from the bowels in fevers. They act moreover by creating an artificial weak part, and thus invite morbid excitement from the blood-vessels to the bowels. They likewise lessen the quantity of

blood by preventing fresh accessions of chyle, being added to it ; but like vomits they are,

1. Uncertain in their operation ; and from the same cause. Many ounces of salts and castor oil, and whole drachms of calomel and jalap, have often been given, without effect, to remove the costiveness which is connected with the malignant state of fever.

2. They are not subject to the direction of a physician, with respect to the time of their operation, or the quantity or quality of matter they are intended to discharge from the bowels.

3. They are unsafe in the advanced stage of fevers. Dr. Physick informed me that three patients died in the water closet under the operation of purges in St. George's hospital during his attendance upon it. I have seen death in several instances succeed a plentiful spontaneous stool in debilitated habits.

III. Sweating was introduced into practice at a time when morbid matter was supposed to be the proximate cause of fever. It acts, not by expelling any thing exclusively morbid from the blood, but by abstracting a portion of its fluid parts, and thus reducing the action of the blood-vessels. This mode of curing fever is still fashionable in genteel life. It
excites

excites no fear, and offends no sense. The sweating remedies have been numerous, and fashion has reigned as much among them, as in other things. Alexipharmic waters, and powders, and all the train of sudorific medicines, have lately yielded to the different preparations of antimony, particularly to James's powder. I object to them all,

1. Because they are uncertain; large and repeated doses of them being often given to no purpose.
2. Because they are slow, and disagreeable, where they succeed in curing fever.
3. Because, like vomits and purges, they are not under the direction of a physician, with respect to the quantity of fluid discharged by them.
4. Because they are sometimes, even when most profuse, ineffectual in the cure of fever.
5. The preparations of antimony lately employed for the purpose of exciting sweats, are by no means safe. They sometimes convulse the system by a violent puking. Even the boasted James's powder has done great mischief. Dr. Goldsmith and Mr. Howard, it is said were destroyed by it.

IV. Mercury, the Sampson of the *Materia Medica*, after having subdued the venereal disease, the tetanus, and many other formidable disorders, has lately added to its triumphs and reputation, by overcoming the inflammatory and malignant state of fever. I shall confine myself in this place to its depleting operation when it acts by exciting a salivation. From half a pound to two pounds of fluid, are discharged by it in a day. The depletion in this way is gradual, whereby fainting is prevented. By exciting and inflaming the glands of the mouth and throat, excitement and inflammation are abstracted from more vital parts. In morbid congestion and excitement in the brain, a salivation is of eminent service, from the proximity of the discharge to the part affected. But I object to it as an exclusive evacuant in the cure of fever.

1. Because it is sometimes impossible by the largest doses of mercury, to excite it, when the exigencies of the system render it most necessary.
2. Because it is not so quick in its operation, as to be proportioned to the rapid progress of the malignant state of fever.
3. Because it is at all times a disagreeable, and frequently a painful remedy, more especially where the teeth are decayed.
4. Because

4. Because it cannot be proportioned in its duration, or in the quantity of fluid discharged by it, to the violence, or changes in the fever.

Dr. Chisholm relied, for the cure of the Boullam fever at Grenada, chiefly upon this evacuation. I have mentioned the ratio of success which attended it.

V. **BLISTERS** are useful in depleting from those parts which are the seats of topical inflammation. The relief obtained by them in this way, more than balances their stimulus upon the whole system. I need hardly say, that their effects in reducing the morbid and excessive action of the blood-vessels are very feeble. To depend upon them in cases of great inflammatory action, is as unwise, as it would be to attempt to bale the water from a leaky and sinking ship by the hollow of the hand, instead of discharging it by two or three pumps.

Abstemious diet has sometimes been prescribed as a remedy for fever. It acts directly by the abstraction of the stimulus of food from the stomach, and indirectly by lessening the quantity of blood. It can bear no proportion in its effects, to the rapidity, and violence of an inflammatory fever. In chronic fever such as occurs in the pulmonary consumption, it

it has often been tried to no purpose. Long before it reduces the pulse, it often induces such a relaxation of the tone of the stomach and bowels as to accelerate death. To depend upon it therefore in the cure of inflammatory fever whether acute or chronic, is like trusting to the rays of the sun to exhale the water of an overflowing tide, instead of draining it off immediately by digging a hole in the ground.

Bleeding has great advantages over every mode of depleting that has been mentioned.

1. It abstracts one of the exciting causes, viz. the stimulus of the blood from the seat of fever. I have formerly illustrated this advantage of blood-letting by comparing it to the abstraction of a grain of sand from the eye to cure an ophthalmia. The other depleting remedies are as indirect and circuitous in their operation in curing fever, as vomits and purges would be to remove an inflammation in the eye, while the grain of sand continued to irritate it.

2. Blood-letting is quick in its operation, and may be accommodated to the rapidity of fever, when it manifests itself in apoplexy, palsey, and syncope.

3. It is under the command of a physician. He may bleed *when* and *where* he pleases, and may suit

suit the *quantity* of blood he draws, exactly to the condition of his patient's system.

4. It may be performed with the least attendance of nurses or friends. This is of great importance to the poor at all times, and to the rich during the prevalence of contagious and mortal epidemics.

5. It disturbs the system much less than any of the other modes of depleting, and therefore is best accommodated to that state of the system, in which patients are in danger of fainting or dying upon being moved.

6. It is a more delicate depleting remedy than most of those which have been mentioned, particularly vomits, purges, and a salivation.

7. There is no immediate danger to life from its use. Patients have sometimes died under the operation of vomits and purges, but I never saw nor heard an instance of a patient's dying in a fainty fit, brought on by bleeding.

8. It is less weakening, when used to the extent that is necessary to cure, than the same degrees of vomiting, purging, and sweating.

9. Con-

9. Convalescence is more rapid and more perfect after bleeding, than after the successful use of any of the other evacuating remedies.

By making use of blood-letting in fevers, we are not precluded from the benefits of the other evacuating remedies. Some of them are rendered more certain and more effectual by it, and there are cases of fever, in which the combined or successive application of them all, is barely sufficient to save life.

To rely upon any one evacuating remedy, to the exclusion of the others, is like trusting to a pair of oars in a sea voyage, instead of spreading every sail of a ship.

I suspect the disputes about the eligibility of the different remedies which have been mentioned, have arisen from an ignorance that they all belong to one class, and that they differ only in their force and manner of operation. Thus the physicians of the last century ascribed different virtues to salts of different names, which the chemists of the present day have taught us are exactly the same, and differ only in the manner of their being prepared.

Having replied to the principal objections to blood-letting, and stated its comparative advantages over other

other modes of depletion, I proceed next to mention the circumstances which should regulate the use of it. These are,

I. The state of the PULSE.

The following states of the pulse indicate the necessity of bleeding.

1. A full, frequent, and tense pulse, such as occurs in the pulmonary, rheumatic, gouty, phrenitic, and maniacal states of fever.
2. A full, frequent, and jerking pulse, without tension, such as frequently occurs in the vertiginous, paralytic, apoplectic, and hydroptic states of fever.
3. A small, frequent, but tense pulse, such as occurs in the chronic, pulmonary, and rheumatic states of fever.
4. A tense and *quick* pulse, without much preternatural frequency. This state of the pulse is common in the yellow fever.
5. A slow but tense pulse, such as occurs in the apoplectic, hydrocephalic, and malignant states of fever, in which its strokes are from 60, to 9, in a minute.
6. An

6. An uncommonly frequent pulse, without much tension, beating from 120 to 170 or 180 strokes in a minute. This state of the pulse occurs likewise in the malignant states of fever.

7. A soft pulse, without much frequency or fulness. I have met with this state of the pulse in affections of the brain, and in that state of pulmonary fever which is known by the name of pneumonia notha. It sometimes, I have remarked, becomes tense after bleeding.

8. An intermitting pulse.

9. A depressed pulse.

10. An imperceptible pulse. The slow, intermitting, depressed, and imperceptible states of the pulse, are supposed exclusively to indicate congestion in the brain. But they are all, I believe, occasioned likewise by great excess of stimulus acting upon the heart and arteries. A pulse more tense in one arm than in the other, I have generally found to attend a morbid state of the brain. Much yet remains to be known of the signs of a disease in the brain, by the states of the pulse; hence Mr. Hunter has justly remarked, that "In inflammation of the brain, the pulse varies more than in inflamm-

tions of any other part ; and perhaps we are led to judge of inflammation there, more from *other* symptoms than the pulse.” *

The slow, uncommonly frequent, intermitting, and imperceptible states of the pulse which require bleeding, may be distinguished from the same states of the pulse, which arise from direct debility or an exhausted state of the system, and that forbid bleeding by the following marks.

1. They occur in the beginning of a fever.
2. They occur in the paroxysms of fevers which have remissions and exacerbations.
3. They sometimes occur after blood-letting, from causes formerly mentioned.
4. They sometimes occur, and continue during the whole course of an inflammation of the stomach and bowels. And,
5. They occur in relapses, after the crisis of a fever.

The other states of the pulse indicate bleeding in every stage of fever, and in every condition of the

* Chap. iii. 9.

system. I have taken notice, in another place, of the circumstances which render it proper in the advanced stage of chronic fever.

If all the states of pulse which have been enumerated, indicate bleeding, it must be an affecting consideration to reflect, how many lives have been lost by physicians limiting the use of the lancet only to the tense or full pulse !

I wish it comported with the proposed limits of this essay to illustrate and establish, by the recital of cases, the truth of these remarks upon the indications of bleeding from the pulse. It is the truest index of the state of the system, and when it is perfectly understood, it never deceives. Its frequency, (unconnected with its other states), being under the influence of diet, motion, and the passions of the mind, is of the least consequence. In counting the number of its strokes, we are apt to be diverted from attending to its irregularity and force ; and in these, it should always be remembered, fever chiefly consists. The knowledge acquired by attending to these states of the pulse is so definite and useful, and the circumstances which seduce from a due attention to them are so erroneous in their indications, that I have sometimes wished the Chinese custom of prescribing, from feeling the pulse only, without seeing

seeing or conversing with the patient, were imposed upon all physicians.

To render the knowledge of the indications of blood-letting from the state of the pulse as definite and correct as possible, I shall add, for the benefit of young practitioners, the following directions for feeling it.

1. Let the arm be placed in a situation in which all the muscles which move it shall be completely relaxed ; and let it, at the same time, be free from the pressure of the body upon it.
2. Feel the pulse in all obscure or difficult cases, in both arms.
3. Apply all the fingers of one hand, when practicable, to the pulse. For this purpose it will be most convenient to feel the pulse of the right hand with your left, and of the left hand with your right.
4. Do not decide upon blood-letting in difficult cases, until you have felt the pulse for some time. The Chinese physicians never prescribe until they have counted 49 strokes.
5. Feel the pulse at the intervals of four or five minutes, when you suspect that its force has been

varied by any circumstance not connected with the disease, such as emotions of the mind, exercise, eating, drinking, and the like.

6. Feel the pulsations of the arteries in the temples and in the neck, when the pulse is depressed or imperceptible in the wrists.

7. Request silence in a sick room, and close your eyes in feeling a pulse in difficult cases. By so doing, you will concentrate the sensations of your ears and eyes, in your fingers.

In judging of the states of the pulse which have been enumerated, it will be necessary always to remember the natural difference in its frequency and force in old people and children; also in the morning and evening, and in the sleeping and waking states of the system.

But to return.

II. Regard should be had to the character of the reigning epidemic, in deciding upon blood-letting. If the prevailing fever be of a highly inflammatory nature, bleeding may be used with more safety in cases where the indications of it from the pulse are somewhat doubtful. The character of a previous epidemic should likewise direct the use of the lancet.

The

The pestilential fever which followed the plague in London in 1665, Dr. Sydenham says, yielded only to blood-letting. It is equally necessary in all the febrile diseases which succeed malignant fevers.

III. The constitution of a patient, and more especially his habits with respect to blood-letting, should be taken into consideration, in prescribing it. If he be plethoric, and accustomed to bleeding in former indispositions, it will be more necessary than in opposite states and habits of the system.

IV. Regard should be had to the country or place from which persons affected with fevers have lately arrived, in prescribing the loss of blood. Fevers in America are more inflammatory than fevers in persons of equal rank in Great Britain. From a want of attention to this circumstance, I saw a common pleurisy end in an abscess in the lungs, in a sea-captain in the city of London, in the year 1769, who was attended by a physician of the first reputation in England. He was bled but once. His cure was afterwards trusted to sudorific draughts. His pulse and his American constitution indicated the loss of 50 or 60 ounces of blood.

V. After blood-letting has been performed, the appearances of the blood should be attended to,

in order to judge of the propriety of repeating it. I shall briefly describe these appearances, and arrange them in the order in which they indicate the different degrees of inflammatory diathesis, beginning with the highest.

1. Dissolved blood. It occurs in the malignant states of fever. I have seen it several times in the pleurify, and have once heard of it in a case of gout. I have ascribed this decomposition of the blood to such a violent degree of stimulus upon the blood-vessels, as to dispose them to a paralytic state. It is generally considered as a signal to lay aside the lancet. If it occur in the first stage of a fever, it indicates a very opposite practice. By repeated bleedings, the vessels recover their natural action, and the blood becomes *reduced* to its original texture. Of this I have had frequent experience since the year 1793. It required three successive bleedings to restore the blood from a dissolved to a coagulable state in Mr. Benton. It afterwards became very fizy. If this dissolved blood appear towards the close of a malignant fever, no other benefit than the protraction of life for a day or two, or an easy death, can be expected from repeating the bleeding, even though it be indicated by a tense pulse; for the viscera are generally so much choaked by the continuance of violent action

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in the blood-vessels, that they are seldom able to discharge the blood which distends them, into the cavity in the vessels which is created by the abstraction of blood from a vein. There is some variety in the appearance of this state of the blood, which indicates more or less violent pressure upon the blood-vessels. It threatens most danger to life when it resembles molasses in its consistence. The danger is less when the part which is dissolved occupies the bottom of the bowl, and when its surface is covered with a fizzy pellicle or coat.

Does not the restoration of the blood from its disorganized state, by means of bleeding, suggest an idea of a similar change being practicable in the solids, when they are disorganized by disease? And are we not led hereby to an animating view of the extent and power of medicine?

2. Blood of a scarlet colour, without any separation into crassamentum or serum, indicates a second degree of inflammatory action. It occurs likewise in the malignant state of fever.

3. Blood in which part of the crassamentum is dissolved in the serum, forming a resemblance to what is called the lotura carnium, or the washings of flesh in water.

4. Crassamentum sinking to the bottom of a bowl in yellow serum.

5. Crassamentum floating in serum which is at first turbid, but which afterwards becomes yellow and transparent by depositing certain red and fiery particles of the blood in the bottom of the bowl.

6. Sizy blood, or blood covered with a buffy coat. The more the crassamentum appears in the form of a cup, the more inflammatory action is said to be indicated by it. This appearance of the blood occurs in all the common states of inflammatory fever. It occurs too in the mild state of malignant fevers, and in the close of such of them as have been violent. It is not always connected with the common inflammatory state of the pulse, for I have observed it occasionally in most of the different states of the pulse which have been described. The appearance of this buffy coat on the blood in the yellow fever, is always favourable. It shews the disease to be tending from an uncommon, to a *common* degree of inflammatory diathesis.

It would seem, from these facts, as if the power of coagulation in the blood was lessened in an exact ratio to the increase of stimulus upon the blood-vessels, and that it was increased in proportion to the

the diminution of that stimulus, to that degree of action which constitutes what I have called *common* inflammatory action.

Here as upon a former occasion we may say with concern, if bleeding be indicated by all the appearances of the blood which have been enumerated, how many lives have been lost by physicians limiting the use of the lancet to those cases only, where the blood discovered an inflammatory crust !

These remarks upon the relative signs of inflammatory action in the blood-vessels, should be admitted with a recollection that they are all liable to be varied by a moderate, or violent exacerbation of fever, by the size of the stream of blood, and by the heat, coldness, and form of the cup into which the blood flows. This occasional uncertainty in the indications of the state of fever by the blood, should lead us back to the PULSE. When time, and more attention to this index of the state of the system in fevers, shall have brought to light all the knowledge that the pulse is capable of imparting, the appearances of the blood in fevers, will be regarded as little as the appearances of the urine.

VI. Blood-letting should always be copious where there is danger from congestion or inflammation,
in

in vital parts. This danger is indicated most commonly by pain ; but there may be congestion in the liver, bowels, and even in the head, without pain. In these cases, the state of the pulse should always govern the use of the lancet.

VII. What quantity of blood may be taken, with safety, from a patient in an inflammatory fever ? To answer this question it will be necessary to remark, 1. That in a person of an ordinary size, there are supposed to be contained between 25 and 28 pounds of blood, and 2. That much more blood may be taken when the blood-vessels are in a state of morbid excitement and excitability, than at any other time. One of the uses of the blood is to stimulate the blood-vessels, and thereby to assist in originating, and preserving animal life. In a healthy state of the vessels, the whole mass of the blood is necessary for this purpose ; but in their state of morbid excitability, a much less quantity of blood than what is natural, (perhaps in some cases four or five pounds) are sufficient to keep up an equal and vigorous circulation. Thus very small portions of light, and sound, are sufficient to excite vision and hearing in an inflamed, and highly excitable state of the eyes and ears. Thus too, a single glass of wine will often produce delirium in a fever in a man, who, when in health, is in the habit of drinking a bottle

a bottle every day without having his pulse quickened by it.

An ignorance of the quantity of blood which has been drawn by design, or lost by accident, has contributed very much to encourage prejudices against blood-letting. Mr. Cline drew 320 ounces of blood in 20 days from a patient in St. Thomas's hospital, who laboured under a contusion of the head. But this quantity is small compared with the quantity lost by a number of persons whose cases are recorded by Dr. Haller.* I shall mention a few of them. One person lost 9 pounds of blood, a second 12, a third 18, and a fourth 22, from the nose at one time. A fifth lost 12 pounds by vomiting in one night, and a sixth 22 from the lungs. A gentleman at Angola lost between 3 and 4 pounds daily from his nose. To cure it he was bled 97 times in one year. A young woman was bled 1020 times in 19 years, to cure her of plethora which disposed her to hysteria. Another young woman lost 125 ounces of blood by a natural haemorrhage every month. To cure it, she was bled every day, and every other day for 14 months. In none of these instances, was death the consequence of these great evacuations of blood. On the contrary, all the per-

* *Elementa Physiologiæ*, vol. iv. p. 45.

sons alluded to, recovered. Many similar instances of the safety, and even benefit of profuse discharges of blood by nature and art, might be mentioned from other authors. I shall insert only one more, which shall be taken from Dr. Sydenham's account of the cure of the plague. " Among the other calamities of the civil war which afflicted this nation, the plague also raged in several places, and was brought by accident from another place to Dunstar Castle in Somersetshire, where some of the soldiers dying suddenly, with an eruption of spots, it likewise feized several others. It happened at that time that a surgeon who had travelled much in foreign parts, was in the service there, and applied to the governor for leave to assist his fellow soldiers who were afflicted with this dreadful disease in the best manner he was able ; which being granted, he took so large a quantity of blood from every one at the beginning of the disease, and before any swelling was perceived, that they were ready to faint, and drop down, for he bled them all standing, and in the open air and had no vessel to measure the blood, which falling on the ground, the quantity each person lost, could not of course be known. The operation being over, he ordered them to lie in their tents ; and though he gave no kind of remedy after bleeding, yet of the numbers that were thus treated, not a single person died. I had this relation from

colonel

colonel Francis Windham a gentleman of great honor, and veracity, and at this time governor of the Castle.” *

Again. An ignorance of the rapid manner in which blood is regenerated when lost or drawn, has helped to keep up prejudices against blood-letting. A person (Dr. Haller says) lost five pounds of blood daily from the hæmorrhoidal vessels for 62 days, and another 75 pounds of blood in 10 days. The loss each day was supplied by fresh quantities of aliment.

These facts I hope, will be sufficient to establish the safety and advantages of plentiful blood-letting in cases of violent fever; also to shew the fallacy and danger of that practice which attempts the cure of such cases of fever, by what is called *moderate* bleeding. There are, it has been said, no half truths in government. It is equally true, that there are no half truths in medicine. This half-way practice of moderate bleeding, has kept up the mortality of pestilential fevers in all ages, and in all countries.

I have combated this practice elsewhere, † and have asserted, upon the authority of Dr. Syden-

* Vol. I. p. 131. † Account of the Yellow Fever, in 1793. ham,

ham, that it is much better not to bleed at all, than to draw blood disproportioned in quantity to the violence of the fever. If the state of the pulse be our guide, the continuance of its inflammatory action, after the loss of even an 100 ounces of blood, indicates the necessity of more bleeding, as much as it did the first time a vein was opened. In the use of this remedy it may be truly said, as in many of the enterprizes of life, that nothing is done, while any thing remains to be done. Bleeding should be repeated while the symptoms which at first indicated it continue, should it be until four-fifths of the blood contained in the body are drawn away. In this manner we act in the use of other remedies. Who ever leaves off giving purges in a colic, attended with costiveness, before the bowels are opened? or who lays aside mercury as a useless medicine, because a few doses of it do not cure the venereal disease?

I shall only add under this head, that I have always observed the cure of a malignant fever to be most complete, and the convalescence to be most rapid, when the bleeding has been continued until a *paleness* is induced in the face, and until the patient is able to sit up without being fainty. After these circumstances occur, a moderate degree of force in the pulse will gradually wear itself away without doing any harm.

VIII. In

VIII. In drawing blood, the quantity should be large or small at a time, according to the state of the system. In cases where the pulse acts with force and freedom, from 10 to 20 ounces of blood may be taken at once; but in cases of great indirect debility, where the pulse is depressed, it will be better to take away but a few ounces at a time, and to repeat it three or four times a-day. By this means the blood-vessels more *gradually* recover their vigour, and the apparent bad effects of bleeding are thereby prevented. Perhaps the same advantages might be derived in many other cases from the gradual abstraction of stimuli, that are derived from the gradual increase of their force and number, in their application to the body. In an inflammatory fever, the character of which is not accurately known, it is safest to begin with moderate bleeding, and to increase it in quantity, according as the violence and duration of the disease shall make it necessary. In fevers and other diseases which run their courses in a few days or hours, and which threaten immediate dissolution, there can be no limits fixed to the quantity of blood which may be drawn at once, or in a short time. Botallus drew 3, 4, and 5 pints in a day in such cases. Dr. Physick drew 90 ounces by weight from Dr. Dewees, in a sudden attack of the apoplectic state of fever, at one bleeding, and there-

by

by restored him so speedily to health, that he was able to attend to his business in three days afterwards. In chronic states of fever, of an inflammatory type, small and frequent bleedings are to be preferred to large ones. We use mercury, antimony, and diet drinks as alteratives in many diseases with advantage. We do not expect to cure certain diseases of debility by two or three immersions in a cold bath. We persist with patience in prescribing all the above remedies for months and years, before we expect to reap the full benefits of them. Why should not blood-letting be used in the same way, and have the same chance of doing good. I have long ago adopted this *alterative* mode of using it, and I can now look around me, and with pleasure behold a number of persons of both sexes who owe their lives to it. In many cases I have prescribed it once in two or three months for several years; and in some I have advised it every two weeks, for several months.

There is a state of fever in which an excess in the action of the blood-vessels is barely perceptible, but which often threatens immediate danger to life, by a determination of blood to a vital part. In this case, I have frequently seen the scale turn in favour of life, by the loss of but four or five ounces of blood. The pressure of this, and even of a much

less quantity of blood in the close of a fever, I believe as effectually destroys life, as the excess of several pounds does in its beginning.

In cases where bleeding does not cure, it may be used with advantage as a *palliative* remedy. Many diseases induce death in a full and highly excited state of the system. Here opium does harm, while bleeding affords certain relief. It belongs to this remedy, in such cases, to ease pain, to prevent convulsions, to compose the mind, to protract the use of reason, to induce sleep, and thus to smooth the passage out of life.

IX. Bleeding from an artery, commonly called arteriotomy, would probably have many advantages over venesection, could it be performed at all times with ease and safety. Blood discharged by haemorrhages affords more relief in fevers than an equal quantity drawn from a vein, chiefly because it is poured forth in the former case from a ruptured artery. I mentioned formerly, that Dr. Mitchell had found blood drawn from an artery to be what is called dense, at a time when that which was drawn from a vein in the same persons, was dissolved. This fact may possibly admit of some application. In the close of malignant fevers, where bleeding has been omitted in the beginning of the disorder, blood

drawn from a vein is generally so dissolved, as to be beyond the reach of repeated bleedings to restore it to its natural texture. In this case, arteriotomy might probably be performed with advantage. The arteries, which retain their capacity of life longer than the veins, by being relieved from the immediate pressure of blood upon them, might be enabled so to act upon the torpid veins, as to restore their natural action, and thereby to arrest departing life. Arteriotomy might further be used with advantage in children, in whom it is difficult, and sometimes impracticable to open a vein.

X. Much has been said about the proper place from whence blood should be drawn. Bleeding in the foot was much used formerly, in order to excite a revulsion from the head and breast; but our present ideas of the circulation of the blood have taught us, that it may be drawn from the arm with equal advantage in nearly all cases. To bleeding in the foot there are the following objections: 1. The difficulty of placing a patient in a situation favourable to it. 2. The greater danger of wounding a tendon in the foot than in the arm. And, 3. The impossibility of examining the blood after it is drawn; for in this mode of bleeding, the blood generally flows into a basin or pail of water.

Under this head I shall decide upon the method of drawing blood by means of cups, in the inflammatory state of fever. Where an inflammatory fever arises from local affection, or from contusion in the head or breast, or from a morbid excitement in those, above other parts of the arterial system, they may be useful; but where local affection is a symptom of general and equable fever only, it can seldom be necessary, except where bleeding from the arm has been omitted, or used too sparingly in the beginning of a fever; by which means such fixed congestion often takes place, as will not yield to general bleeding.

XI. Much has been said likewise about the proper time for bleeding in fevers. It may be used at all times, when indicated by the pulse and other circumstances, in continual fevers; but it should be used chiefly in the paroxysms of such as intermit. I have conceived this practice to be of so much consequence, that when I expect a return of the fever in the night, I request one of my pupils to sit up with my patients all night, in order to meet the paroxysm, if necessary, with the lancet. But I derive another advantage from fixing a sentinel over a patient in a malignant fever. When a paroxysm goes off in the night, it often leaves the system in a state of such extreme debility as to

endanger life. In this case, from 5 to 10 drops of laudanum, exhibited by a person who is a judge of the pulse, obviate this alarming debility, and often induce easy and refreshing sleep. By treating the human body like a corded instrument, in thus occasionally relaxing or bracing the system, according to the excess or deficiency of stimulus in those hours in which death most frequently occurs, I think I have been the means of saving several valuable lives.

I regret that the limits I have fixed to this defence of blood-letting will not admit of my applying the principles which I have delivered, to all the inflammatory states of fever. I have shewn, in a former publication, the advantages of bleeding in the hydropic state of fever. In a future essay, I hope to establish its efficacy in the gouty and maniacal states of fever. I have said that madness is the effect of a chronic inflammation in the brain. Its remedy, of course, should be frequent and copious blood-letting. Physical and moral evil are subject to similar laws. The mad-shirt, and all the common means of coercion are as improper substitutes for bleeding in madness, as the whipping-post and pillory are for solitary confinement and labour, in the cure of vice. The pulse should govern the use of the lancet in this,

this, as well as in all the *ordinary* states of fever. It is the dial-plate of the system. But in the *misplaced* states of fever, the pulse, like folly in old age, often points at a different mark from nature. In all such cases, we must conform our practice to that which has been successful in the reigning epidemic. A single bleeding, when indicated by this circumstance, often converts a fever from a suffocated or latent, to a sensible state, and thus renders it a more simple and manageable disease.

It is worthy of consideration here, how far local diseases, which have been produced by fevers, might be cured by re-exciting the fever. Sir William Jones says the physicians in Persia always begin the cure of the leprosy by blood-letting.* Possibly this remedy diffuses the disease through the blood-vessels, and thereby exposes it to be more easily acted upon by other remedies.

I intended to have enlarged upon the good effects of bleeding in several diseases which are not accompanied with fever, but having trespassed too long upon the reader's patience, by the minuteness of my details upon this subject, I shall take notice at present of its efficacy in but the five following morbid states of the system.

* Asiatic Essays.

1. During the period in which the menses cease to flow, there is always a morbid fulness and excitement in the blood-vessels; hence the head aches, coughs, drop-sies, hæmorrhages, glandular obstructions, and cancers, which occur in that stage of life. They may all be prevented by frequent and moderate blood-letting.

2. Pain is probably not connected necessarily with child-bearing. Many of the other evils inflicted upon the human race, in consequence of the disobedience of our first parents, have been lessened or eradicated by the ingenuity of man. The pain of child-bearing travellers tell us, is much lessened among the Turkish women, by their taking sweet oil (which acts as a purge) during their pregnancy. Direct debility, whether induced by fasting or long and slow diseases, tends alike to mitigate the pains of labour. These facts have led me to inquire, whether blood-letting does not produce the same effect. I have often observed labours to be short and comparatively easy, which have succeeded a fever that has been cured by bleeding. Upon my mentioning this fact to Dr. Dewees, he informed me that he had often bled when parturition was slow, and that he had always found that he thereby both shortened and lessened the pains of labour.

3. I have

3. I have said that there is but one remote cause of fever. Of course there can be no essential difference between the stimulus of the saliva of a rabid animal, and the stimulus of contagion or miasmata, in inducing morbid actions in the system. The heat, thirst, quick and tense pulse, and local effusions which occur in the HYDROPHOBIA, indicate it to be a spasmodic state of fever. As there is but one remote,* and one proximate cause of fever, so there is but one method of curing it, and that is by reducing morbid action when it is excessive by depletion, and afterwards removing debility by tonic remedies. I can see no reason why the hydrophobia should not yield to these obvious, and universal principles in medicine. From its great force, it is probable it will require the most copious bleeding, and afterwards the most powerful tonics to cure it of any disorder in the world.

4. In dislocations of bones which resist both skill and force, it has been suggested that bleeding, un-

* The exciting cause of fever, which may be considered as forming an exception to this simple view of its remote cause, is nothing but a reinforcement of the remote cause, when it is too feeble to excite fever. It generally acts as a stimulus, and when it acts by abstracting a natural stimulus from the body, it throws such a balance of force into the scale of the remote cause, as to enable it to induce fever.

til fainting is induced, would produce such a relaxation in the muscles as to favour their reduction. This principle was happily applied in the winter of 1795, by Dr. Physick in the Pennsylvania hospital, in a case of a dislocated humerus of two months continuance. The Doctor bled this patient until he fainted, and then reduced his shoulder in less than a minute, with a very small exertion of force.

5. I have elsewhere spoken in favour of blood-letting in some of the diseases of old age.* The palsy, apoplexy, cough, and colic, so common among old people, might, I believe be prevented in many instances by the occasional, but moderate use of this remedy.

Thus have I finished my defence of blood-letting as a remedy for certain diseases. Let not the reader suppose that I am unduly attached to it. I have little reason to be so, for the dread of my using it in every disease, and the false reports of my using it in equal degrees in diseases of opposite characters, have deprived me probably of many thousand pounds in the course of my life. But my predilection for the lancet above all other depleting remedies, has affected my happiness, much more than my interest.

* Medical Inquiries, and Observations, Vol. II.

It has made the duties of my profession (which would otherwise be pleasant) extremely painful to me. Often have I been forced to submit my judgment to the fears and prejudices of my patients, and thereby to consume days and weeks in curing a disease, which might have been cured in some instances by the loss of a few ounces of blood, in a day or an hour. Often, when the appearance of danger has made the prescription of blood-letting necessary to save life, have I read disaffection to it in dejected looks, or tears, and sometimes heard it in the screams of a whole family. And often have I been reproached for killing people by bleeding, who have died, only because they submitted to the remedy when it was too late, or because it was too sparingly administered to do them service. Nor have the testimonies of whole families and neighbourhoods who have been cured of malignant fevers by bleeding, balanced the discredit of the loss of the few patients in whom it was thus improperly used ; for the recoveries in those cases have been considered as remarkable, only because the patients survived the frequent use of the lancet.

It was in consequence of the violence that blood-letting offered to the feelings of his patients, and to the practice of cotemporary physicians, that Dr. Sydenham

Sydenham was forced to adopt sweating as a substitute for bleeding in the plague, and to use it very sparingly in the rheumatism. I have reason to lament his having accommodated this favourite remedy to ignorance or fear in a single disease. Had he persisted in the use of it, he would indeed have “blessed mankind, and rescued me.”

We are sometimes told by the terrorists in medicine, that the Indians cure their inflammatory fevers without bleeding. To relieve myself from the distress and obloquy to which my use of this remedy exposed me, I have carefully sought for, and examined their remedies for inflammatory fever with a sincere desire to adopt them; but my inquiries have satisfied me, that they are not only wholly disproportioned to the habits of civilized life, but that they are far less successful than blood-letting even among themselves. With the same wish to avoid a painful conflict with the fears and prejudices of my patients, I have prescribed all the remedies which are set down under the first head of the syllabus, as substitutes for bleeding, but I am sorry to add, without effect. However useful they may be as auxiliaries to blood-letting, they are all feeble without it, when used to cure a fever of violent inflammatory action.

In contemplating the prejudices against blood-letting which prevail so generally in our country, I have been led to ascribe them to a cause wholly political. We are descended chiefly from Great Britain, and have been for many years under the influence of English habits upon all subjects. Some of these habits, as far as they relate to government, have been partly changed ; but in dress, arts, manufactures, manners, and science, we are still governed by our early associations. Britain and France have been for many centuries hereditary enemies. The hostility of the former to the latter nation, extends to every thing that belongs to their character. It discovers itself, in an eminent degree, in diet and medicine. Do the French love soups ? the English prefer solid flesh. Do the French love their meats well cooked ? the English prefer their meats but half roasted. Do the French sip coffee after dinner ? the English spend their afternoons in drinking Port and Madeira wines. Do the French physicians prescribe purges and glysters to cleanse the bowels ? the English physicians prescribe vomits for the same purpose. Above all, do the French physicians advise bleeding in fevers ? the English physicians forbid it, in most fevers, and substitute sweating in the room of it. Here then we discover the source of the prejudices and errors of our countrymen, upon the subject of blood-letting. They are of British origin.

origin. They have been inculcated upon us in British universities, and in British books ; and they accord, as illy with our climate, and state of society, as the Dutch foot stoves did, with the temperate climate of the Cape of Good Hope.*

It is probable the bad consequences which have followed the indiscriminate, use of the lancet in France, and some other countries, may have contributed in some degree to create the prejudices against it, which are entertained by the physicians in Great Britain. Bleeding like opium has lost its cha-

* I have frequently been surprized in visiting English patients, to hear them say, when I have prescribed bleeding, that their physicians in England, had charged them never to be bled. This advice excluded all regard to the changes which climate, diet, new employments, and age might induce upon the system. I am disposed to believe that many lives are lost, and numerous chronic diseases created in Great Britain by the neglect of bleeding in fevers. My former pupil Dr. Fisher in a letter from the University of Edinburgh, dated in the Winter of 1795, assures me that he had cured several of his fellow students of fevers (contrary to general prejudice) by early bleeding, in as easy and summary a way as he had been accustomed to see them cured in Philadelphia, by the use of the same remedy. Dr. Gordon of Scotland, and several other physicians in Great Britain have lately revived the lancet, and applied it with great judgment, and success to the cure of fevers.

rafter in many cases by being prescribed for the *name* of a disease. It is still used, Mr. Townsend tells us, in this empirical way in Spain, where a physician, when sent for to a patient, orders him to be bled before he visits him. The late just theory of the manner in which opium acts upon the body, has restrained its mischief, and added greatly to its usefulness. In like manner, may we not hope that just theories of diseases, and proper ideas of the manner in which bleeding acts in curing them, will prevent a relapse into the evils which formerly accompanied this remedy, and render it a great and universal blessing to mankind?

I have great pleasure in acknowledging, that the establishment and defence of blood-letting has not been committed to me alone, in the city of Philadelphia. A number of our physicians, highly respectable for talents and knowledge, have adopted this invaluable remedy, and have used it with a success which has rendered their practice reputable to themselves, and beneficial to the public. The superior success of the friends of blood-letting in recovering patients, is acknowledged by all ranks of citizens; but they have been taught by some of the physicians of the city to believe, that this success does not extend to malignant and dangerous diseases. For example. These gentlemen say the yellow fevers which

which we cure by copious blood-letting are common remittents or intermittents; and that the manias, the internal drop-sies of the brain, and the pulmonary consumptions which we prevent, or cure, by the same remedy, are either transient derangements of mind from trifling fevers, or common head aches, or colds. But error and calumny in this, as in many other cases, refute themselves. It is well known that all those diseases have prevailed for several years in our city, and that most of our physicians have had their usual proportion of patients in them. It is scarcely possible that we should maintain our proportion of business, and not meet with the same number of cases of those diseases as our brethren. We do meet with them, and we prevent their mortality, in a great degree, by copious or frequent blood-letting.

From the influence which this detraction from the merit of bleeding has upon its success, we are forced to lament, that the greatest possible benefits will never be derived from it, until the same uniformity of opinion and practice obtain with respect to its use, which prevails with respect to the use of pure air and cool drinks in fevers.

How long error, ignorance, prejudice, and interest, upon the subject of blood-letting, shall con-

time to render fevers one of the principal outlets of human life, I know not ; but their influence cannot last always. Perhaps the blessings of speedy health, long life, and more universal population, which are insured in a great degree by the use of this remedy, may be reserved by heaven for a more virtuous and enlightened race of men, than those who compose the present inhabitants of our globe.

I shall conclude this work by a reflection which has been suggested by some of the preceding pages.

The present is an eventful æra in human affairs. Our world appears to be upon the eve of a great and universal revolution. This revolution, I believe, will ultimately be in favour of human happiness. I do not find my belief of a change for the better, in the condition of mankind, upon the present state of things ; for every view we can take of them, whether it be directed to morals, religion, or government, exhibits the reverse of such a change. I believe in the rapid approach of a new order of things, from the coincidence of present events with the predictions contained in the Old and New Testaments. These predictions are now accomplishing by natural means. Events, essential to each other, have lately taken place, as if by concert, in different nations ; and truths, essential to those events, have been

been discovered or revived in different parts of the world. Thus, in a former age, the discovery of the art of printing was connected with the revival of letters, and a change in the moral and religious state of Europe. Thus, too, the application of the load-stone to the purpose of navigation, immediately preceded the discovery and settlement of America. One of the predictions alluded to in the Old Testament is, that agriculture, civilization, peace, and just government shall be introduced into the eastern countries, and of course, that an immense increase of the human species shall be effected by their influence, in that part of the globe. To this delightful change in the state of the eastern part of the world, there exists but one natural obstacle; and that is, the plague and other malignant fevers still continue to depopulate whole cities and nations, thereby often producing every species of public and private misery. The extent of this misery may easily be conceived of, by the recital of a single and recent event. In the year 1773 one of those malignant fevers destroyed 275,000 people in Bassorah, amounting to seven-eighths of the inhabitants of that city. To obviate the objection to the fulfilment of ancient prophecy, from the prevalence of malignant and destructive fevers in the east, it will only be necessary to attend to what has been said by Dr. Hartley, upon the propagation of Christianity throughout the world by

natural

natural means. “ Mankind (says this enlightened philosopher and Christian) seem to have it in their power to obtain such qualifications in a natural way, as, by being conferred upon the Apostles in a supernatural one, were the principal means of their success in the first propagation of the Gospel.

“ Thus, as the Apostles had the power of healing miraculously, future missionaries may, in a short time, accomplish themselves with the knowledge of all the chief practical rules of medicine. This art is wonderfully simplified of late years, and is improving every day in simplicity and efficacy. And it may be hoped, that a few theoretical positions, well ascertained, with a moderate experience, may enable the young practitioner to proceed to a considerable variety of cases with safety and success.” *

What Dr. Hartley preconceived with respect to diseases in general, has, we hope, been realized with respect to malignant fevers. If we may judge from the success which has lately attended the treatment of one of them in the cities of Baltimore and Philadelphia, we may safely assert, that no one of them is incurable. It will not be necessary to send men, educated in colleges, into the Asiatic countries to

* *Observations on Man*, Proposition clxxxiii. p. 378.

cure their pestilential diseases. Men, and even women, may be employed for that purpose, who have not perverted their reason by a servile attachment to any system of medicine. It will be sufficient for our missionaries to know, that a powerful epidemic chases away, or mixes with all other diseases, to be acquainted with the different states of the pulse, to be able to open a vein, to administer a few strong doses of purging physic, and to gratify the calls of nature in their patients for cold water and cool air.

I enjoy, in the prospect of these events, a consolation which surpasses, beyond calculation, all the distress and pain I have felt from my unsuccessful attempts to introduce the remedies for malignant fevers into general use among the citizens of Philadelphia; for the men who are to live an hundred years hence, and in foreign countries, should be considered as equally fellow citizens with those who are our coevals, and who live and die in the same country with us.

THE END.

